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THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—30TH YEAR. SYDNEY, SATURDAY, MAY 15, 1943. No. 20.

EPITOME OF RECENT PUBLICATIONS

VITAMIN C AND MENSTRUATION

An experiment was carried out on 32 unmarried women of the industrial class, all of whom were suffering from menorrhagia, to demonstrate the relationship between vitamin C deficiency and nutritional anaemia due to menorrhagia. The women were pale, listless, thin, constipated, easily tired, with poor appetites and in constant dread of their monthly periods. After a test dose of 'Redoxon' sufficient to produce saturation, 20 of the 32 cases were restored to a clinically normal condition, 8 were improved, and 4 had no change. There was a diminution in the duration of the menstrual periods, an increase in the percentage haemoglobin of the blood, and a disappearance of pain and symptoms associated with dysmenorrhoea. The improvement was greatest in the worst cases.

Ulster Medical Journal, Oct. 1940, p. 117.

TREATMENT OF GINGIVITIS

In a period of ten weeks 18 out of 505 new patients at the Dundee Dental Hospital were found to be suffering from gingivitis. Each patient was given 300 mg. of ascorbic acid ('Redoxon') daily until urine tests showed that saturation had been reached; no local dental treatment or antiseptic mouth washes were employed. Even after a single dose changes in the gum tissue were observed, the red and congested area had shrunk to half its original size and the pain had largely disappeared. The amount of ascorbic acid needed to saturate the patient varied from 900 to 4,200 mg., the average being 2,000 mg. In most cases bleeding ceased after four days' treatment and all the patients felt much better in general health. When a normal condition of the gums had been restored, a maintenance dose of 100 mg. a day was given. The results suggest a vitamin C deficiency as an important factor in gingivitis.

British Medical Journal, March 8, 1941, p. 360.

AFFECTIONS OF THE CORNEA

Large doses of 'Redoxon' given intravenously were employed to accelerate the metabolism of the cornea and assist in the healing of local inflammatory lesions. Cases on which this treatment was employed consisted of corneal ulcer, keratitis, scleritis, and a case of seborrhoeic dermatitis with keratitis and corneal ulceration of both eyes. Treatment consisted of intravenous injections of 500 mg. 'Redoxon' given every alternate day, and in some cases was continued by the oral administration of 'Redoxon' tablets. The treatment produced considerable improvement.

British Journal of Opthalmology, June, 1941, p. 286

RAPID WOUND HEALING

The important role played by ascorbic acid in wound healing and its value in bringing about rapid improvement in gingivitis prompted the authors to investigate the effects of 'Redoxon' vitamin C in the healing of wounds following tooth extraction. The results obtained by its use for the first case "were so dramatic that it was decided to apply the method in a number of cases" to confirm the first impression. Eight cases were treated, and the most striking features were the rapid healing of gum tissue and, what was even more impressive, the rapid absorption of the alveolar bone margins. In four cases not previously treated with ascorbic acid, where persistent bleeding after extraction was present, a dose of 500 mg. vitamin C had a marked effect in arresting haemorrhage.

British Dental Journal, Jan. 1, 1942, p. 6.

PULMONARY TUBERCULOSIS

Studies on vitamin C excretion were carried out on 79 tuberculous patients and its value in treatment in 282 cases of which 128 were observed for more than a year. In the more advanced cases the degree of vitamin C exhaustion appeared to be proportional to the severity of the disease and the daily intake of the vitamin. No patient should have less than the optimum standard dosage of 0.84 mg. per kg. of body weight per day (50–60 mg. total) and the dose should be progressively increased to 200 mg. daily. In advanced cases benefit is obtained by keeping the patient saturated with vitamin C.

J.A.M.A., 1941, 116, 469.

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SUPPLEMENT NUMBER 15 ON WAR MEDICINE AND SURGERY:
Open Wounds of the Head in Wartime.

STUDIES IN THE DEPOSITION OF LEAD IN BONE: I. CALCIFICATION AND LEAD DEPOSITION.

By F. R. BARRETT, M.Sc.,

From the School of Public Health and Tropical Medicine, University of Sydney.

THE parallelism of calcium and lead metabolism was first postulated by the Aub school of workers[1][2] They showed that when calcium is being removed from the bones some stored lead is also liberated. The evidence for the parallelism of calcium and lead deposition is less definite. Sobel, Yuska, Peters and Kramer[3] recently demonstrated that lead may be deposited in the bones while calcium is being removed from them. On the other hand, Lederer and Bing[4] found no evidence of rickets. The object of the work reported in this paper was to determine what actually takes place.

Materials and Methods.

A basal diet was devised, which was a "purified" one except for the yeast. It consisted of glucose 48 parts, potato dextrin 22 parts, egg albumen (steamed) nine parts, casein (acid-washed) nine parts, lard four parts, cottonseed oil one part, salts (free from calcium and phosphorus) three parts, brewer's yeast two parts, and baker's yeast two parts. The animals were also given 120 microgrammes of β-carotene per rat per week, and 600 international units of vitamin D_3 per rat per week were given orally as calciferol dissolved in glycerin.

The basal diet (diet A) contained 0·02% of calcium and 0·13% of phosphorus. To diet A was added basic lead carbonate to give a basal leaded diet (diet B) containing 0·80% of lead. To diet B was added anhydrous sodium phosphate to give a high phosphorus leaded diet (diet C) containing 0·73% of phosphorus.

Piebald rats from an original Wistar strain were used. The mothers were fed on the stock diet of Bills *et alii*.[5] Weanlings weighing 50 grammes were distributed among the three experimental diets as evenly as possible with regard to litters, weights, age and sex. The average number of animals receiving each of the three diets was 12. The standard deviations of the mean initial weights of the rats receiving the respective diets varied from $\pm$ 2·8 to $\pm$ 4·5.

At the end of twenty-five days the animals were anæsthetized and blood was obtained by heart puncture. The femora were removed and freed of all adhering tissue. From each femur the middle portion of the diaphysis was dissected out and the marrow was removed. The middle diaphysis and the femoral ends were analysed separately. Extreme care was taken to dissect out the mid-shaft at the same relative position in each of the bones. The bones were dried at 105° C. for forty-eight hours, extracted with ether, and again dried. The dried defatted bones were then ashed to constant weight in an electric muffle furnace at a temperature below 600° C.

Normal weanlings weighing 50 grammes from the same litters—that is, corresponding to the animals used in the experiments before they were placed on the various diets—were also killed, and the femora were similarly treated.

Bone lead estimations were carried out on the ash by the dithizone (diphenylthiocarbazone) method as developed by Murray and Stephens,[6] with slight modifications instituted in collaboration with the former worker, until accurate reproducible results were obtained.

Definitions.

The following definitions were used: (i) The middle diaphysis or mid-shaft is that portion of the diaphysis or shaft enclosing the medullary cavity. This portion of the femur contains no cancellous bone. (ii) The distal diaphysis is that portion of the femur extending from the distal epiphyseal plate to the edge of the cancellous bone adjoining the medullary cavity.

Results and Observations.

Mean Ash Values.

The mean ash values of the middle diaphyses (compact bone) and of the bone ends (compact and cancellous bone) are presented in Table I. The data obtained were

TABLE I.
Mean Ash Values of Bone Fractions.

Group (Based on Diet).	Ash Content of Mid-shaft.			Ash Content of Femoral Ends.			Mean Change in Body Weight.	
	Milligrammes.	S.D.[1]	Percentage.	Milligrammes.	S.D.	Percentage.	Grammes.	S.D.
A (basal)	11·8	±0·55	63·4±1·4	26·5	±1·3	38·4±3·0	+36	±6·7
B (basal, leaded)	7·7	±0·74	50·4±1·8	22·0	±1·6	39·3±1·2	+4	±4·7
C (high phosphorus, leaded)	9·0	±0·61	62·4±2·1	21·3	±1·2	39·0±2·4	+9	±4·0
D (normal rats)	11·0	±0·57	64·5±1·2	23·5	±2·1	41·0±3·2	—	—

[1] S.D. = standard deviation.

evaluated statistically. "Ash Percentage" represents the percentage of ash of the dried fat-free bone. The mean changes in body weight are also included in the table to show that comparisons with the basal group (group A) must be made with the ash weight and not with the percentage ash, the disparity in body growth being reflected in part in the amount of organic matter in the bones.

Middle Diaphyses.—The basal diet was sufficient to produce a slight but significant increase in the ash weight of the mid-shaft (group A), when compared with that of the normal rats, although there was no significant difference in the ash percentage (see Table I).

The addition of lead to the basal diet resulted in considerable decalcification of the middle diaphysis (group B), with significant differences in ash weight and in ash percentage. The loss of mineral matter was 30% (compare groups B and D). On macroscopic examination the mid-shaft was thin.

Intermediate figures were obtained when phosphorus was added to the basal leaded diet (group C). That is, decalcification was less than in the basal leaded diet group, but greater than the basal diet rate. The loss of mineral matter was 18% (compare groups C and D). Macroscopically the mid-shaft appeared firmer than that of group B.

Femoral Ends.—A mean ash increment of 3·0 milligrammes was obtained in the basal diet group (group A). That is, the increase was twice as great at the ends of the bone (13%) as in the trabecular-free shaft (7%) (see Table I).

The addition of lead to the basal diet resulted in definite demineralization of the femoral ends (compare groups A and B). However, when compared with group D—that is, with the bone of the rat immediately before being placed under experiment—the loss was small, although significant. From the mid-shaft of the femora of group B, 30% of the mineral matter was lost, but only 6% was lost from the femoral ends. But the compact bone of the ends, except that of the distal diaphysis, was also thin. That is, calcification took place, and this calcification was much greater at the ends than in the mid-shaft, corresponding to a similar observation (*vide supra*) with the basal diet group. Further, in spite of the great decalcification of the whole of the compact bone, the distal diaphysis was firmer than the rest of the bone. That is, calcification was greatest at the distal diaphyseal plate.

No significant difference was found in the bone ends between the basal leaded diet and the high phosphorus leaded diet groups (compare groups B and C).

Deposition of Lead in the Bone Fractions.

Mean figures for the distribution of lead between the middle diaphyses and the bone ends are presented in Table II. The lead values within and between the groups were evaluated statistically.

Only 13% to 18% of the total amount of lead deposited was found in the mid-shafts. Expressed as percentage ash, twice as much lead was laid down in the ends of the bone as in the mid-shaft; that is, epiphyseal lead was twice as active as diaphyseal lead, just as epiphyseal calcium was found to be twice as active as diaphyseal

TABLE II.
Mean Lead Values of Bone Fractions.

Group (Based on Diet).	Mid-shaft.					Femoral Ends.				
	Lead.		Lead in Ash.		Lead in Organic Matter	Lead.		Lead in Ash.		Lead in Organic Matter.
	Microgrammes.	S.D.	Milligrammes *per Centum.*	S.D.	Milligrammes *per Centum.*	Microgrammes.	S.D.	Milligrammes *per Centum.*	S.D.	Milligrammes *per Centum.*
B (basal, leaded)	35	±5·4	451	±49	673	230	±22·0	1,045	±89	680
C (high phosphorus, leaded)	18	±3·1	205	±41	333	84	±14·7	394	±75	253

TABLE III.
Distribution of Lead in Bone Fractions of Group B.

Bone Fraction.	Nature of Bone.	Ash. (Milligrammes.)	Lead in Ash.	
			Microgrammes.	Milligrammes *per Centum.*
Middle diaphysis	Compact	7·5	40·7	543
Distal diaphysis	Compact and cancellous	6·8	96·7	1,422
Rest of bone	Compact and cancellous	12·6	115·0	912

calcium. Expressed as percentage organic matter, there was little difference within the respective groups between the amount of lead in the end and the amount of lead in the mid-shaft. Therefore, lead was being deposited in the more actively metabolizing bone, as in calcification.

The addition of phosphorus resulted in a decrease of mid-shaft lead to one-half, and of bone-end lead to one-third.

A further subdivision of the femora of group B was undertaken. Five rats were used, each weighing 50 grammes. The findings are presented in Table III.

The highest concentration of lead was found in the distal diaphysis; the lowest in the middle diaphysis, composed of compact bone only. This finding corresponds with the observation that calcification was greatest at the distal diaphyseal plate, least in the middle diaphysis. The intermediate figures obtained for the rest of the bone suggest that it was composed of old compact bone and trabeculæ, whereas the distal diaphysis contained new compact bone also.

Discussion.

Sobel *et alii*[20] found that lead might be deposited in the bones while calcium was being withdrawn. They concluded that lead deposition did not necessarily go in the same direction as calcium deposition.

Fractionation of the bone, however, yields information of the calcifying and decalcifying processes. In this work it was found that at least 30% of the mineral matter might be withdrawn from the compact bone, where there was no lead, and that this accelerated decalcification might be accompanied by simultaneous calcification and lead deposition at the epiphyses.

Further, it was shown that epiphyseal lead was twice as active as diaphyseal lead, just as epiphyseal calcium, under the conditions of these experiments, was found to be twice as active as diaphyseal calcium.

Bone growth was observed in the distal diaphysis only. The highest concentration of lead was also found in the distal diaphysis.

Therefore, lead is deposited at those sites where the new calcium is also being deposited. Lead exhibits the same relative activities at the calcifying sites as calcium, the least activity being in the subperiosteum of the shaft, the greatest at the distal diaphyseal plate.

When phosphorus was added to the diet, it was found that lead deposition is decreased both in the shaft and at the epiphyses. This will be discussed in a subsequent paper.

Summary.

1. The rate of deposition of lead is greater in epiphyseal than in diaphyseal bone. This ratio was found to be about two. The greatest rate of deposition is at the distal epiphysis. Similarly, the deposition rate of epiphyseal calcium is about twice that of diaphyseal calcium. This higher rate of epiphyseal deposition is attributable to the greater vascularity of the soft bone.

2. The simultaneous lead deposition and removal of calcium from the bones, found by other workers, have been shown to be due to accelerated decalcification of the compact bone, in which there was no lead, with simultaneous calcification and lead deposition at the epiphyses.

Acknowledgements.

I wish to thank Professor Harvey Sutton, Director of the School of Public Health and Tropical Medicine, for permission to carry out this work, and Dr. R. E. Murray for his kindly interest.

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TYPHUS: MODIFIED BREINL METHOD FOR STAINING RICKETTSIÆ AND OTHER INCLUSIONS.

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ELEMENTARY inclusion or virus bodies have received a considerable amount of attention from the points of view of morphology and propagation. Buist (1887) was apparently the first to devise a staining method for this type of organism; since then numerous methods have been introduced, mainly for smear preparations. The most outstanding of these or modifications of them are undoubtedly those of Giemsa (1910) and Castaneda (1930); the only method suggested for sections appears to be that of Ochi (1938), which in my hands proved ineffective. Van Rooyen and Rhodes (1940) apparently felt the need of something better, since they made the following observation:

> The formation of colonies, i.e. inclusions, inside cells is probably necessitated by the limited metabolic powers of this group of agents. If this be so, however, why have not inclusions been demonstrated in all virus infections? Perhaps it is only because our staining methods are relatively crude and fail to demonstrate the presence of virus aggregates in cytoplasm or in nucleus.

This latter suggestion appears to be justifiable, if we take Heaslip's (1940) remarks as a reflection of the other methods; with regard to Laigret and Auburtin's (1938) method, he makes the following observation:

> I have had great difficulty in finding rickettsiæ in smears from guinea-pigs, even when the animals were definitely known to be infected. On the other hand, many smears of such animals, especially those prepared from the *tunica vaginalis*, show bipolar bacilli, of which the smallest look very like Rickettsiæ.

Smith (1940) also had difficulty in staining *Rickettsia burneti* in ticks by the May-Grünwald-Giemsa method, finding differentiation between secretory globules and organisms difficult; but he obtained good results with Castaneda's method.

This investigation was initiated because I had received from Dr. W. G. Heaslip a series of mice inoculated with three strains of scrub typhus, and it was considered a good opportunity of testing out the various staining methods; as a result we found that there was, indeed, plenty of room for improvement.

For section work none of the methods was suitable, with the possible exception of the Giemsa series, which, however, were too prolonged for practical application. In consequence of these failures, attempts were made to find a combination which could be applied to both smear and section material. After a considerable amount of patient work in this direction, attention was focused on Breinl's (1911) method, used for the morphology of *Wuchereria bancrofti*; although the original technique was not satisfactory, a modification proved useful, and provided care was exercised in differentiation, the results were excellent.

With rickettsiæ and the inclusion bodies of psittacosis and a diplococcal form of the skin in a laboratory rat, the results were extremely good, while it was also found that old and faded smears could be rejuvenated.

Technique.

The technique has been divided into two series: series A, which includes both fresh and old faded smears, and series B, which includes sections of vertebrate and arthropod tissue. Both series consist essentially of fixation, staining, differentiation and counterstaining. Breinl used Unna's orange-tannin for the last-mentioned; but owing to the impossibility of obtaining a fresh supply of this proprietary product, an orange G-tannic acid substitute had to be evolved, and this proved to be superior to the original.

Series A: For Fresh Smears.

1. Make the smears thin; they should be evenly distributed and dried in the air.
2. Fix for one minute with acetic-Zenker solution.
3. Wash well with water.
4. Soak for one minute in 1% potassium iodide solution.
5. Wash well with water.
6. Stain for two minutes with Löffler's methylene blue (30 cubic centimetres of saturated alcoholic methylene blue, mixed with one cubic centimetre of 1% potassium hydroxide solution in 99 cubic centimetres of distilled water).
7. Wash well with water.
8. Differentiate and counterstain for 0·5 to 2 minutes, constantly moving the slide in orange-tannin solution (three grammes of orange G dissolved in 150 cubic centimetres of 70% alcohol, mixed with 350 cubic centimetres of distilled water in which 50 grammes of tannic acid have been dissolved).
9. Wash well in water.
10. Dry in air or by blotting with fluffless paper.

Series AI: For Old Faded Smears.

Smears faded after the use of the Giemsa, Castaneda, Archibald and other methods should be decolourized with methyl alcohol and restained by carrying the procedure described above from the fourth step onwards.[1]

Series B: For Tissue Sections.

1. Fix small pieces of tissue for two hours at 60° C. or overnight at room temperature in acetic-Zenker solution.
2. Wash in water and pass to 70% alcohol.
3. Clear of mercury in iodized alcohol solution, dehydrate, clear, and embed in paraffin.
4. Cut sections 4·0μ or 5·0μ in thickness, flatten on water at 45° to 47° C.
5. Mount on slides and dry overnight in the incubator at 37° C.
6. Clear off paraffin with xylol, pass through graded alcohols to water.
7. Complete mercury extraction for two minutes in 1% potassium iodide solution and wash in water.
8. Stain for two minutes with Löffler's methylene blue.
9. Wash well with water.
10. Differentiate and counterstain for 0·5 to 2 minutes by constantly moving the slide in the orange-tannin solution.
11. Wash well with water.
12. Pass with constant motion through graded alcohols to xylol.
13. Mount in neutral balsam.

Series BI: Technique for Arthropod Sections.

The staining technique is essentially the same as that adopted for other tissues. According to Bolles Lee (1937), sections of *Ixodida* are difficult because of the exoskeleton; he suggests that the chitin be stripped after partial fixation. However, I found this difficult with the ticks received from Dr. E. H. Derrick, of Brisbane. These were well fixed and had remained in the fixative for a considerable time before I was able to start work on them; consequently I was forced to attempt the embedding of the complete animal. Although the time was somewhat extended, it was considered worth while, since under these conditions there was practically no disturbance of the internal structures and the relative position of the organs could be followed fairly well. I am, therefore, persuaded to give the details of the procedure, since it enabled me to obtain reasonable sections at a thickness of 8·0μ.

1. Fix the material for at least twenty-four hours in acetic-Zenker solution.
2. Wash well in running water.
3. Pass up slowly through graded alcohols to 70%.
4. Treat with iodized 70% alcohol for an extended period, adding fresh iodine solution if required.
5. Extract iodine in 70% alcohol.
6. Dehydrate thoroughly.
7. Use two changes of a mixture of equal parts of absolute alcohol and ether, each for at least twenty-four hours.
8. Impregnate for three to seven days in 2% celloidin in alcohol and ether; leave for a similar period in 4% celloidin solution.
9. Soak for one and a half to two weeks in 6% celloidin in alcohol and ether.
10. Transfer with a minimum of celloidin to chloroform, and harden for a few hours.
11. Impregnate with chloroform and paraffin for two hours at 60° C.
12. Put through two changes of paraffin at 60° C., leaving for thirty minutes in each.
13. Embed the animal and cut serial sections; flatten them and mount them on numbered slides; dry them overnight in an incubator at 37° C.
14. Continue as in series B from the sixth step.

Relative Distribution of Organisms in Tissues.

Owing to the lack of a suitable staining method for sections of animal tissues, the distribution of the intracellular and extracellular organisms in the undisturbed tissues appears to have received little attention. The intracellular organisms (rickettsiæ) appear to have a fairly general distribution in the various organs, such as the liver, spleen, tunica, brain and frequently the lungs *et cetera*. In the laboratory rat, the intracellular diplococcal type of organisms are found in the skin; but whether such intracellular organisms have a general distribution in the other organs remains to be proved. The extracellular rickettsiæ appear, in the main, to be confined to various tissue fibres and to the interspaces of the cellular contents of blood vessels in cross sections.

Regarding the distribution of rickettsiæ in the arthropod host, Topley and Wilson (1937) define rickettsiæ as organisms whose natural habitat in arthropods is the intestinal canal. Smith, referring to *Rickettsiæ burneti* in *Hæmaphysalis humerosa*, gives the distribution as the lumen of the gut, and in epithelial cells he considers them morphologically similar to the animal organisms; but that they sometimes assume the appearance of cocci in well-packed colonies. It is possible, however, that the coccal type of organism is merely one viewed "end on". In the gut the organisms appear to be confined to the mid-gut and hind-gut and are scattered among the granular contents and in epithelial cells. An ideal location for the organisms appears to be the Malpighian tubules, which provided practically a pure culture. In the lumen of the gut the thinner layers of organisms show characteristic staining qualities, which can be easily picked up with a low-power objective. The conglomerate or thick masses of organisms, however, appear somewhat darker in the epithelial cells and in the Malpighian tubes. Differentiation from the degenerate cells and other intestinal débris is simple, owing to the fact that these are counterstained.

[1] Differentiation should be carried out carefully by washing at intervals and noting the extent of extraction of the primary stain. This is particularly important when sections are concerned, as the various tissues differ considerably in their capacity to retain stain.

Summary.

1. A differential staining method is suggested for rickettsiæ and other inclusion bodies; it is applicable to smears and sections of animal and arthropod material.
2. The method may be used for restaining old faded smears.
3. A substitute for Unna's orange-tannin solution is brought forward.
4. A technique is given for obtaining serial sections of ticks.

Acknowledgements.

My thanks are extended to Professor Harvey Sutton and Dr. W. C. Sawers for permission to carry out the work; to Dr. W. G. Heaslip for scrub-typhus material; to Sir Raphael Cilento and Dr. E. H. Derrick for "Q" fever material; to Dr. Anton Breinl for the original method; and to Mr. S. Woodward-Smith, Department of Medical Artistry of the University of Sydney, for the photomicrographs. I am particularly indebted to Dr. R. E. Murray for his unfailing and kindly interest in the checking of the results and in this paper.

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Reports of Cases.

A CASE OF HUMAN ENCEPHALITIS WITH TYPE "A" INTRANUCLEAR INCLUSION BODIES.

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THIS paper deals with the clinical and pathological findings of a case of human encephalitis associated with type A intranuclear inclusion bodies. Only four such cases have been recorded previously, all of them in the United States of America. Two were described by Dawson,[1][2] one by Smith, Lennette and Reames,[3] and one by Akelaitis and Zeldis.[4] Despite much experimental work, Dawson was unable to transmit the disease from either of his patients to mice, guinea-pigs, monkeys, rabbits, dogs or chickens. On the other hand, Smith, Lennette and Reames succeeded in isolating from the brain a virus identical with that of *herpes febrilis*. Akelaitis and Zeldis did not attempt to transmit the disease.

In the present case, by the time the pathological findings were known, no material was available for the inoculation of animals. The symptomatology and pathology are recorded, however, in the hope that when similar cases occur material will be preserved in glycerine for this purpose.

[1] Working with the aid of a grant from the National Health and Medical Research Council of Australia.

CLINICAL RECORD.

G.A., a white unmarried man, aged twenty-one years, was an aircraft assembler. He was admitted to the Royal Adelaide Hospital under the care of Sir Trent Champion de Crespigny on March 5, 1942, with a provisional diagnosis of *diabetes mellitus* and Bell's palsy. He was known to have suffered from diabetes since September 15, 1941, and had previously been admitted as an in-patient on September 22, 1941, for stabilization of this condition. On his discharge from hospital on November 8, 1941, his urine was free from sugar when protamine zinc insulin was administered in a dose of 15 units once a day; the man was then taking a diet containing 150 grammes of carbohydrate, 90 grammes of protein and 80 grammes of fat, equivalent to 1,680 Calories. Under these conditions he remained well and was able to go to work.

Two days prior to his admission to hospital, the patient's mother had noticed that the left side of his face was swollen. To the patient his face felt as though he had had a local anæsthetic for the removal of a tooth. He also had great difficulty in speaking. This symptom, like the facial numbness, had become less appreciable by the time of his admission to hospital. On the night prior to his admission he had about twelve "spasms", during which his tongue felt swollen, and according to his mother he looked as if he was trying to spit something out. The "spasms" varied in length, the longest lasting about two minutes. There was no loss of consciousness. The patient had been aware of a pink rash on his abdomen for some days. He had noticed no abnormalities with regard to his bowel actions, micturition or weight, and had kept strictly to his diet and his injections of insulin.

Additional information obtained from the mother, about three weeks after his death, revealed that he had suffered from a severe cold associated with sores at the corners of his mouth a fortnight prior to his admission to hospital. The mother, her husband, three daughters and another son lived in the same house as the patient; all had remained well. The house was clean and free from rats and mice. No similar illness had occurred among his fellow-workers. Painting was included among his duties. Sometimes he had complained of headaches after this work.

On examination, his temperature was 98° F. and his pulse rate 82 per minute; his respirations numbered 20 per minute. He appeared healthy, and was able to sit up in bed and answer questions. Only the right half of his face moved when he talked or smiled. Examination of his fauces revealed slight redness, and some of his teeth were decayed. Examination of his cardio-vascular and respiratory systems revealed no abnormality, apart from the fact that his blood pressure was 160 millimetres of mercury (systolic) and 110 (diastolic). The only abnormality detected on examination of his nervous system was the left-sided facial paralysis mentioned earlier; this was thought to be of the lower motor neurone type. Examination of his urine revealed severe glycosuria and moderate ketonuria.

The patient was given a diet containing 100 grammes of carbohydrate, 50 grammes of protein and 50 grammes of fat. The amount of protamine zinc insulin administered was reduced to 12·5 units once a day. On the following day the amount of carbohydrate in his diet was increased to 150 grammes per day, while the protamine zinc insulin was replaced by standard insulin given in doses varying from 20 to 30 units twice a day. This diet and dosage of insulin were maintained throughout the course of his illness. On the first two days after his admission to hospital additional glucose together with the requisite amount of insulin was given in order to combat ketosis. Although acetone and diacetic acid disappeared from the urine and were not again evident until the last day of his illness, tests always revealed moderate to severe glycosuria.

During the first night in hospital the patient had numerous attacks of twitching. On the following morning (March 6) he had two epileptiform attacks, which started at his jaw and spread down his body. In one seizure the attack began with his left hand in the typical *"main d'accoucheur"* position. As it was considered possible that the attacks might be manifestations of tetany, 30 cubic centimetres of a 10% solution of calcium gluconate were administered intravenously. On March 7 the blood calcium level was 10·7 milligrammes, the blood phosphorus level 5·5 milligrammes, and the blood phosphatase level 11·6 units, all per 100 cubic centimetres of serum. Thus, although the amount of blood calcium was within normal limits, there was a slight increase in the amount of phosphorus and phosphatase in the blood.

On the night of March 10, the patient had another slight seizure with generalized twitching. After the attack,

twitching of the left corner of his mouth was noted, while his respiratory rate had risen to 60 breaths per minute. Pressure over his right facial nerve led to spasm of his right facial muscles. The attack was treated by the hypodermic administration of 0·25 grain of morphine.

On the following afternoon the patient was cyanosed and his temperature had risen to 103° F. The percussion note on the left anterior aspect of his chest was impaired and bronchial breathing was present. Lumbar puncture yielded blood-stained cerebro-spinal fluid under a pressure of 230 millimetres of water. There was no rise in pressure on compression of the jugular veins. The fluid was faintly golden in tint, and contained 400 red blood corpuscles per cubic millimetre without excess of white cells. There was a slight increase in the amount of globulin, while 50 milligrammes of protein were present per 100 cubic centimetres of fluid. No microorganisms were detected either by direct smear or by attempted culture. A further test of the blood showed that the respective amounts of calcium, inorganic phosphorus and phosphatase were within normal limits. The patient was given an initial dose of three grammes of "M & B 693" soluble, followed by further doses of one gramme every four hours. In addition, 20 cubic centimetres of a 10% solution of calcium gluconate were injected intravenously.

The patient died on the morning of March 12, 1942, seven days after his admission to hospital, and nine days after the onset of his illness. Apart from rises of temperature to 100° F. and 99° F. on the afternoons of March 5 and March 7 respectively, the patient was apyrexial during the first five days in hospital.

POST-MORTEM EXAMINATION.

The autopsy was performed by Professor J. B. Cleland about twenty-four hours after the patient's death. Apart from the cerebral condition, the only abnormalities discovered were extreme distension of the stomach, the fact that the pancreas appeared to be smaller than normal, and congestion and œdema of the bases of the lungs, especially on the left side. The provisional cause of death was given as encephalitis of unknown origin in a diabetic.

Pathological Report.

Macroscopic Examination.

Slight excess of cerebro-spinal fluid was present in the subarachnoid space, and the pial vessels were moderately congested. Examination of sections of the brain, after fixation in 10% formol saline solution, revealed congested small vessels in both the cortex and white matter, more numerous in the former. The congestion, which was patchy in distribution, was not necessarily related to areas of pathological change; it occurred also in regions which were otherwise normal.

Microscopic Examination.

Cerebrum.—For the most part, infiltration of the pia-arachnoid was confined to regions with pathological changes in the underlying cortex, and in intensity it was proportionate to the severity of these changes. It was most apparent in the lateral sulcus, the central sulcus, the *sulcus cinguli* and the superior temporal sulcus, and over the post-central gyrus, the gyri of the insula, the superior temporal gyrus and the opercular portion of the inferior frontal gyrus. Mild meningitis was noted also in the hippocampal sulcus. In addition, a few scattered inflammatory cells were present elsewhere in the pia-arachnoid. They occurred mainly in the depths of sulci in regions free from underlying pathological changes—for example, in the inferior temporal sulcus and in certain of the sulci of the occipital lobe.

In the most severely affected areas, the pia-arachnoid was distended with a fibrinous exudate packed with inflammatory cells (Figures I and II). When similar cells were present in the molecular (plexiform) layer of the underlying cortex, the boundary between meninges and cortex was obscured. The cells of the infiltrate consisted of polymorphonuclear leucocytes, often showing degenerative changes, together with adventitial cells and lymphocytes. In places considerable numbers of red blood corpuscles were also present. As the intensity of the meningitis decreased, the proportion of polymorphonuclear leucocytes diminished and the proportion of mononuclear cells increased.

In cortical areas severely involved by the pathological process, pronounced congestion and œdema accompanied by focal and perivascular softening of nervous tissue were present. Examination of nerve cells and neuroglia revealed various stages of degeneration leading to necrosis; in most instances these changes were associated with the presence of intranuclear inclusion bodies. Changes in the interstitial tissues included degeneration and necrosis of the walls of blood vessels, extraadventitial and perivascular infiltration, and diffuse and focal tissue infiltration. In addition, occasional minute hæmorrhages were observed.

Foci of necrosis occurred in all cortical laminæ. There was a tendency, however, for such foci to be larger and more numerous in the deeper layers of the cortex. Many of the foci had a perivascular distribution; the vessels were surrounded by areas of necrosis up to two to four times the diameter of the vessel, and sometimes more (Figure II). Examination of these areas in sections stained by the Weil-Weigert and Bielschowsky methods, showed that in many cases there was total destruction of myelin and axones. In others, partial destruction had occurred and the remaining nerve fibres were beaded and swollen. In the walls of vessels surrounded by these areas degenerative changes were always present, and often necrosis was found. The pathological process started at the periphery of the vessel and passed inwards, so that the intima was affected last. Usually the areas of perivascular necrosis were accompanied by a fibrinous exudate associated with degenerating polymorphonuclear leucocytes and polymorphic microglial cells (Figure III). These cells formed cuffs of extraadventitial infiltration. Occasionally the infiltration did not occur, and the vessel was surrounded by a zone of partial disintegration of the nervous parenchyma. Other small foci of necrosis were not related to vessels. They appeared as pale areas, often containing karyorrhectic nuclei. Sometimes complete dissolution of the necrotic foci had occurred, giving the cortex a spongy appearance. In a few places the necrotic foci had coalesced, and this had led to areas of softening, which sometimes involved the whole extent of a cross-section of the grey matter of a gyrus. Occasionally there were areas of subpial softening which involved the first two or three cortical laminæ.

The pathological process manifested no apparent selective affinity for the nerve cells of any particular cortical lamina; but the cells of the first and second layers were usually not involved so heavily as the others. Lesions of the nerve cells ranged from mild degenerative changes to necrosis. Milder changes included swelling of the cell and of its nucleus, mild to moderate chromatolysis and nuclear and nucleolar eccentricity. In nerve cells more severely affected the cytoplasm stained palely, was ill-defined, and was surrounded by a pronounced perineuronal space. In each cell the nucleus was swollen and eccentric and margination of the nuclear chromatin was present, while the nucleolus had either disappeared or abutted on the nuclear membrane. Lying in the nucleus were one or more inclusion bodies. In the most severely affected regions, either all the nerve cells were necrotic, or else they had undergone such advanced degenerative changes that recovery of function would have been improbable. Some of the cells had disappeared entirely; in others there was no trace of cytoplasm, but the position of the cells could be recognized by the presence of ill-defined thickened nuclear membranes sometimes containing traces of inclusion bodies. In areas involved more mildly, necrosis and degenerative changes of nerve cells were focal rather than diffuse in character. Some of the necrotic nerve cells were attacked by polymorphonuclear leucocytes and later by microglial cells and underwent neuronophagia.

The size and shape of the intranuclear inclusions were variable (Figure IV). Usually the nucleus contained a single, large acidophilic inclusion body, which stained pink with Giemsa and with phloxin-methylene blue, and pinkish-lilac with hæmatoxylin and eosin. Often the inclusion body conformed in shape to the general contour of the nuclear membrane, or was separated from it by a clear zone. Occasionally thin strands of pinkish material could be seen radiating from the margins of the inclusion body to the membrane. Less often the nucleus was occupied by two or more inclusion bodies, each about two or three times the size of a nucleolus and connected together by fibrillary strands. These bodies were less well defined than those mentioned previously. In thick sections the inclusion bodies appeared homogeneous; but in thin sections they were granular.

The nuclei of neuroglial cells adjacent to nerve cells with intranuclear inclusion bodies often contained similar bodies. For the most part, the inclusion bodies were confined to the nuclei of oligodendroglia and astrocytes. Very rarely, however, they were also demonstrable in the nuclei of microglial cells. In character the inclusion bodies were similar to those described in the nerve cells.

Where the pathological process was intense, tissue infiltration was extremely severe and manifested itself in all cortical

laminæ. It was both diffuse and focal in distribution; the latter type was predominant in regions which were affected less heavily. Although in all cortical layers an enormous increase in cells had occurred, in places the molecular lamina was particularly involved (Figure I). The cells of the infiltrate consisted of polymorphic microglial cells together with considerable numbers of polymorphonuclear leucocytes, in which degenerative changes were often present. The number of the latter present was to a certain extent directly proportionate to the severity of the pathological change.

For the most part the cellular infiltration related to blood vessels was of the extraadventitial type mentioned earlier. True perivascular infiltration with lymphocytes, other mononuclear cells and a few polymorphonuclear leucocytes was seen only in mildly affected regions. The severe degenerative and necrotic changes of the walls of blood vessels were occasionally followed by the extravasation of moderate numbers of red blood corpuscles into the surrounding tissues. In a few instances thrombosis of vessels occurred; it should be emphasized, however, that the general character of the necrosis of the nervous tissue bore no resemblance to that which results from vascular thrombosis.

The foregoing description deals with the end-result of the action of the causal agent on the cortex. Occasional cortical areas were encountered, however, in which the only apparent variation from normal was the presence of intranuclear inclusion bodies in nerve and neuroglial cells; this showed that the primary attack of the ætiological agent was on the parenchyma.

Distribution of Cortical Lesions.—In the right cerebral hemisphere the affected areas included, in order of severity, the posterior central gyrus and the gyri of the insula, the portion of the anterior central gyrus adjacent to the central sulcus, the *gyrus cinguli*, the superior frontal gyrus and the opercular portion of the inferior frontal gyrus. The pathological process in the cortex of the left cerebral hemisphere was not quite so severe or so widely distributed as that on the right side. It involved the posterior central gyrus and the gyri of the insula, the portion of the anterior central gyrus adjacent to the central sulcus and the *gyrus cinguli*.

Changes were noted also in the right middle temporal gyrus and right visual cortex. They differed in character from the remainder of the cortical lesions, amounting to no more than mild perivascular cuffing of a few scattered vessels.

White Matter.—The pathological process in the white matter was most severe in those regions which were immediately subjacent to heavily involved areas of the cerebral cortex. In thickness these areas were about half that of the overlying cortex. The lesions were characterized by focal and perivascular necrosis, by the presence of intranuclear inclusion bodies in the neuroglia, by extraadventitial and perivascular infiltration, and by diffuse and focal tissue infiltration. In most respects they were similar to those described in the cortex, except that with a few exceptions the necrosis was partial rather than complete. There was no selective destruction of myelin; such loss as occurred was that attendant on necrosis of the nervous tissue as a whole (Figures V and VI).

In addition to the foregoing changes, a considerable number of vessels in the *centrum semiovale* of both hemispheres were surrounded by cuffs of severe perivascular infiltration. Occasional vessels with similar infiltration were seen also in the *corpus callosum*.

Cornu Ammonis and Gyrus Dentatus.—On the right side there was moderate diffuse infiltration of the *cornu Ammonis* and the *gyrus dentatus* with microglia at the "rod" cell stage, associated with moderate perivascular infiltration. Occasional pyramidal cells of the *cornu Ammonis* and a few cells of the *gyrus dentatus* had disappeared. No lesions were detected on the left side.

Amygdaloid Nucleus.—In the right nucleus there were a few areas of focal and diffuse infiltration associated with degenerative changes in the related nerve cells. Actual necrosis of neurones, however, was uncommon. In a few vessels moderate perivascular cuffing was present. Also present was a small telangiectasis, probably congenital in origin. The left nucleus was normal

Basal Ganglia.—Lesions in the basal ganglia were much more pronounced on the right side than on the left, where changes were absent or minimal. On the right side the claustrum was severely affected. The changes included severe congestion and œdema, perivascular and focal necrosis, necrosis and degenerative changes of nerve cells, and severe perivascular and tissue infiltration. Similar, but less intense, lesions occurred in the putamen and *globus pallidus*. The pathological process in the caudate nucleus was limited to a few vessels with moderate perivascular infiltration, a minute hæmorrhage, and a small focus of infiltration with "rod" cells and a few polymorphonuclear leucocytes associated with degenerative changes in adjacent nerve cells. In the thalamus examination of the anterior and medial nuclei and upper third of the lateral nucleus revealed a few vessels with moderate perivascular infiltration. The lesions in the remainder of the thalamus were similar in character to the changes described in the claustrum. On the left side, a few vessels with moderate perivascular infiltration were noted in the putamen and claustrum. In the latter there was also some mild diffuse infiltration. The caudate nucleus, *globus pallidus* and thalamus were normal.

Ventricles.—Examination of the subependymal tissues of the anterior horn of the right lateral ventricle revealed occasional vessels with severe perivascular cuffing and some areas of pronounced diffuse infiltration.

Choroid Plexuses.—Apart from some mild hyalinization of the walls of the vessels, the choroid plexuses were normal.

Brain-Stem and Cerebellum.—Meningitis was almost entirely absent and nowhere amounted to more than a few scattered cells, despite the fact that the brain-stem was fairly severely involved by the pathological process. In this respect the pia-arachnoid infiltration of this region was in great contrast to that of the cerebrum.

Brain-Stem.—The lesions of the brain-stem were similar in nature to those described in the more intensely affected parts of the right basal ganglia. Their distribution was variable. In the mid-brain and pons the most severe changes occurred in the ventral portion, involving in the case of the former the red nucleus and to a lesser extent the *substantia nigra* and *basis pedunculi*, especially on the right side. In the pons the region of the *nuclei pontis* and the cortico-spinal and cortico-bulbar tracts was most severely affected. The lesions in the *medulla oblongata* were largely confined to the tegmentum, especially in the region of the floor of the fourth ventricle. At all levels of the brain-stem, however, in addition to the severe lesions, occasional vessels affected by moderate, and sometimes severe, perivascular infiltration were noted. In the motor nerve cells throughout the brain-stem, including those of the oculomotor, abducent, facial, lateral vestibular, and hypoglossal nuclei, together with those of the *nucleus ambiguus*, never more than mild degenerative changes were found. In this respect the pathological process was in direct contrast to that of poliomyelitis (Swan[6]). Incidentally, the absence of changes in the facial nucleus suggested that the facial paralysis was of the upper rather than of the lower motor neurone type.

Cerebellum.—Apart from a few scattered areas of congestion in the molecular layer, a few vessels with mild perivascular cuffing in the *brachium pontis* and one small focus of tissue infiltration in the right dentate nucleus, the cerebellum was normal.

Spinal Cord.—The spinal cord was not available for examination.

Discussion.

Clinically, the present case had the following points in common with those described earlier (see Table I). In all the disease was of sudden onset, with symptoms and signs of initial attack upon, and progressive involvement of, the central nervous system. All the patients were comparatively young, their ages ranging from four weeks to twenty-one years. Four of the five patients were males. The presence of a skin rash or *herpes labialis*, or both, at some stage in the course of the disease, was noted in all of the cases except that of Akelaitis and Zeldis. Their patient, however, had an infected wound on the dorsum of the left hand. All of the cases were similar in that there was no appreciable increase in the number of white cells in the cerebro-spinal fluid, while the pressure of the fluid was almost within normal limits.

The present case bore most resemblance to that of Smith, Lennette and Reames, not only in the symptomatology and rapid progress of the disease, but also in the fact that in neither did hyperpyrexia develop; it occurred in all the remaining cases. The cases reported by Dawson differed in the long duration of the disease and in the development of a terminal condition of post-encephalitic Parkinsonism characterized by stupor, mask-like facies and "lead-pipe" rigidity of the extremities. That of Akelaitis and Zeldis lay midway between the cases described by Smith, Lennette and Reames, and by myself, and those recorded by Dawson.

TABLE I.
Analysis of the Recorded Cases of Encephalitis with Intranuclear Inclusion Bodies.

Case Number.	Authors.	Age of Patient. (Years.)	Sex.	Duration of Illness. (Days.)	Clinical Record.	Attempts to Isolate an Ætiological Agent.
I	Dawson.	16	M.	524	Acute onset. Two remissions in course of disease. Terminal acute exacerbation. Patient found unconscious in street sixteen months before admission to hospital (no further details). "Sunstroke" twelve months previously from which he recovered rapidly. Influenza eight months previously. For some time, slowing of voluntary motor activity, psychic changes and reversal of sleep cycle. For one week prior to admission, jerking movements of limbs. *Herpes labialis.* Mask-like face, increasing lethargy, and increase in severity and frequency of twitchings and convulsions. "Lead-pipe" rigidity of extremities. Terminal hyperpyrexia.	Unsuccessful.
II	Dawson.	5	F.	116	Acute onset. Three months prior to admission to hospital patient awoke from sleep with an attack of hallucinations and excitement. At time of onset patient was suffering from eczema and scabies. For an indefinite period, jerking movements of extremities gradually increasing in frequency and severity. Later, aphasia and stupor. Maculo-papular rash on body. "Lead-pipe" rigidity of limbs. Terminal hyperpyrexia.	Unsuccessful.
III	Smith, Lennette and Reames.	4/52	M.	9	Acute onset. Irritability, refusal to nurse, occasional twitchings of left side of body and limbs. One generalized convulsion on sixth day. Increasing intracranial tension. Seborrhœic dermatitis of scalp.	Herpes virus isolated.
IV	Akelaitis and Zeldis.[4]	5	M.	63	Acute onset. Stiffness and twitching of left arm, gradually increasing in intensity and later involving left leg. Hyperkinetic seizures of left side. Later dystonic seizures involving both sides of body and leading to opisthotonos-like states. Occasional tremors of tongue and extremities. Dysphagia and transient ocular palsies. Lower left-sided facial paresis. Right-sided plantar reflex extensor in type. Increasing coma. Hyperpyrexia. Sensory hypæsthesias, conjugate deviation of eyes to right, retraction of head with rotation to right. In final week decrease in spasticity of extremities and in opisthotonos-like seizures.	None made.
V	Swan.	21	M.	9	Acute onset. *Diabetes mellitus.* Left-sided facial paralysis. Left-sided facial hyperæsthesia. Many attacks of twitching, sometimes generalized and sometimes involving left side of mouth and left hand. Terminal basal pneumonia. *Herpes labialis.* Rash on body.	None made.

The brunt of the pathological process was borne by the grey matter, especially that of certain areas of the cerebral cortex. Lesions in the grey matter of the basal ganglia and brain-stem were less intense. That the primary attack of the causal agent was on nerve cells and neuroglia of ectodermal origin was shown by the fact that there were cortical regions in which the only variation from normal was the presence of intranuclear inclusion bodies in these cells. With regard to the occurrence of similar inclusion bodies in microglia, it should be pointed out that they were detected extremely rarely, and that only in cells immediately adjacent to totally necrotic neurones. The progress of the degenerative changes in the nerve cells to necrosis was associated with an intense interstitial and vascular reaction, of which the most prominent features were degenerative and necrotic changes of the walls of blood vessels, exudation of fibrin, pronounced tissue and extraadventitial infiltration, and severe meningitis.

Severe changes occurred in the white matter only in areas immediately subjacent to heavily involved cortical regions. Little more need be said of these lesions, except to emphasize that there was no true demyelination; the myelin disappeared only as a part of the general tissue disintegration. Comparison of similar areas stained by the Weil-Weigert and Bielschowsky methods showed that myelin sheaths and axis cylinders were equally affected.

Pathologically, in the present case there were a number of pronounced differences from those described earlier. For instance, in places, infiltration of the pia-arachnoid was extremely severe, whereas in the earlier cases meningitis was, at most, mild in intensity. In all cases except that investigated by Smith, Lennette and Reames, in which the pathological examination was limited to the brain-stem and cerebellum, the most severe changes were found in the cerebral cortex. But whereas the distribution of the cortical lesions in the cases of Akelaitis and Zeldis and of Dawson was ubiquitous, in my case the pathological changes were confined to certain areas which were fairly symmetrical in each cerebral hemisphere. A point of difference noted between Dawson's cases and the remainder was that in the former, in addition to acute lesions, glial scars indicative of an older process were present. Furthermore, in Dawson's cases foci of softening common to the other three were absent.

The presence of type A intranuclear inclusion bodies suggests that the ætiological agent was almost certainly a filtrable virus. Any opinion expressed with regard to the nature of this virus must be purely speculative. Type A intranuclear inclusion bodies have been reported (not necessarily in the nervous system) in *herpes febrilis*, varicella, *herpes zoster*, virus B infection, pseudo-rabies, Rift Valley fever, yellow fever, dog distemper, fox encephalomyelitis, infectious tracheitis of chickens, virus III infection of rabbits, and the salivary gland virus infections of guinea-pigs, rats and mice. Of the diseases mentioned, only the seven first-named are known to infect man. Of these, virus B infection, pseudo-rabies, Rift Valley fever and yellow fever do not occur in Australia. Incidentally, it may be mentioned that certain of the pathological changes in the present case, namely, necrosis of the nervous parenchyma and pronounced lesions of the walls of blood vessels, were reminiscent of those of virus B infection (Sabin and Hurst[8]). Inclusion bodies, however, were rarely detected in cells of mesodermal origin; in virus B infections they are common. Moreover, only one human case of virus B infection has ever been recorded (Sabin and Wright[7]); this followed a monkey bite.

In view of the occurrence of *herpes labialis* during the course of the disease, the similarity of the illness to that described by Smith, Lennette and Reames, in which the virus of *herpes febrilis* was isolated, and the resemblance of the pathological process to that of herpetic encephalitis of rabbits, it seems most likely that the present case was due to the same cause. Unfortunately, however, conclusive evidence is lacking, owing to the fact that no attempt was made to isolate the virus.

The patient had noted a pink rash on his abdomen, present for some days prior to his admission to hospital, and the possibility of varicella or *herpes zoster* was considered. As the rash was not sufficiently severe to call for medical attention, its exact nature is not certain. It would seem unlikely, however, that it was due to *herpes zoster* or to varicella, as traces of vesicles would probably still have been present at the time of his admission to hospital. Furthermore, the pathological findings of encephalitis occurring in the course of these diseases (Biggart and Fisher,[5] Zimmerman and Yannet[9] and Van Bogaert[10] shows no significant resemblance to those of the present case.

A final explanation, though an unlikely one, is that the disease may be due to a new virus.

SUMMARY.

A white male patient, aged twenty-one years, suffering from *diabetes mellitus*, developed a left-sided facial paralysis and left-sided facial hyperæsthesia, together with many attacks of general and sometimes local twitching, and died nine days after the onset of the disease. Pathological examination revealed a severe widespread necrotic type of encephalitis with type A intranuclear inclusion bodies.

ACKNOWLEDGEMENTS.

I am deeply indebted to Sir Trent Champion de Crespigny for permission to publish this case, to Professor E. Weston Hurst for helpful criticism and advice, to Professor J. B. Cleland for use of the autopsy notes and for the pathological material, and to Mr. Hugh Gilmore for the photomicrography.

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ADDENDUM.

Since the submission of the foregoing paper for publication, an additional paper by T. D. Kinney, entitled "Intranuclear Inclusions in Infancy", has appeared in *The American Journal of Pathology*, Volume XVIII, Number 5, September, 1942, at page 799.

A GRASS SEED IN A LUNG: AN ACCIDENTAL AUTOPSY FINDING.

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THE specimen to be described was obtained from the lung of a girl, aged seven years, at post-mortem examination. The child was admitted to hospital in a stuporose condition and died without recovering consciousness. No further details of the clinical history are recorded.

Autopsy Findings.

The dura appeared to be under tension from increased pressure of cerebro-spinal fluid in the supratentorial subarachnoid space. A hydatid cyst, the size of a cricket ball, was found lying on the floor of the anterior cranial fossa, indenting the under surface of the right frontal lobe. There was no macroscopic evidence of any leakage of hydatid fluid from the cyst. The brain was hardened with the cyst *in situ*, and the specimen was later included in the museum of the Pathology Department of the University of Melbourne.

A fibrous nodule the size of a grain of wheat was found on the lateral pleural surface of the upper lobe of the right lung. It was excised for microscopic examination as a probable "healed" primary tuberculous lesion.

Routine examination of the rest of the body revealed no abnormality of any other organ.

The Nodule.

Macroscopic examination of the section when mounted showed that the lesion consisted of an area of greatly increased cellularity. In this area the object which was subsequently identified as a grass seed was seen lying in a clear space, where it was just visible to the naked eye.

Microscopic Examination.

Because a hydatid cyst of the brain had been present, the unusual appearance seen on microscopic examination was too hastily diagnosed as being of hydatid origin, and a competent pathologist was temporarily misled into regarding the lesion as a fourteen day old primary hydatid cyst. (See Figure I, magnification 72, and Figure II, magnification 200.)

The correct diagnosis was arrived at when the specimen was referred to Dr. Rupert Willis, pathologist to the Alfred Hospital, Melbourne. Dr. Willis drew attention to the "undoubted cellulose walls and nuclei identical with those of young plant tissue" which could be seen in the interior of the "foreign body". Dr. Willis made the following further comments:

> The situation of the nodule is clearly within a bronchus, the wall of which is very inflamed, with much of its lining desquamated; that it is a bronchus is evident from the presence of several remaining glands in the inflamed tissue—this tissue contains giant cells close to the little foreign body. . . .

Mr. P. F. Morris and Mr. J. H. Willis, botanists to the National Herbarium, Melbourne, examined the specimen and reported as follows:

> In our opinion, the obstruction embedded in the lung is the seed of a monocotyledonous plant, probably that of a grass (Gramineæ). The "foreign body" shows the general structure of a seed cut transversely, and probably just through the upper end of the embryo. The section shows from the outside inwards cells of a testa, an aleurone layer, endosperm and embryo tissue, which closely resemble figures of small grains figured in reference works such as *"Pflanzenfamilien"* by A. Engler and K. Prantl, and sections, cut for comparison from fresh grass seeds.

Discussion.

The histological appearances (catarrhal inflammation, accumulation of lymphocytes and giant cell formation) present no unique feature, and are such as might be expected from the lodgement in a bronchus of a foreign body of low irritative power.

As is well known, substances of vegetable origin inhaled into the bronchial tree commonly provoke an intense inflammatory reaction with associated infection. In the case of the peanut, death may follow rapidly unless the foreign body is removed. In more chronic cases abscess formation or bronchiectasis may occur, while with still other vegetable foreign bodies (of which the present specimen probably represents an example) the reaction is one of chronic inflammation with eventual fibroid changes, and in many instances bronchial stenosis.[1]

The type of tissue reaction that will result appears to be determined in the main by the size and shape of the inhaled foreign body, by its chemical and bacteriological properties, and by the site in which it lodges.

Mechanical Factors.

Apart from the obvious influence of size, the shape of the inhaled foreign body materially affects the tissue response which it will provoke. H. Marshall Taylor[2] found that the Florida sand spur seed caused an intense laryngeal spasm when impacted in the larynx, the clinical picture after twenty-four hours being practically indistinguishable from that of laryngeal diphtheria. Taylor concludes that the intense inflammation that occurred was due to the trauma inflicted by the minute spikes which are present on the sand spur seed and to bacterial invasion of the resulting wounds.

Chemical and Bacteriological Factors.

It is obvious that in the case of the peanut specific chemical properties exert an intensely irritative effect on the lung tissue. The authority whom Taylor consulted stated that seeds of the family of Gramineæ or grasses (in which family the present specimen is classified) "are singularly devoid of active chemical principles". In the case of the sand spur, the bacteriological investigations indicated a similar absence of potential bacterial irritants. Attempts at culture of seeds taken from the open field yielded "no fungi or pathogenic organisms". The histological appearances in the present case indicate that the grass seed was probably bacteriologically sterile, and that, unlike the peanut, it lacked any particularly irritative chemical properties.

It seems reasonable to apply Taylor's conclusion with reference to the sand spur to the present case: ". . . (the sand spur) . . . has no inherent property. It should be placed in the category of a foreign body producing only mechanical effects."

The Site.

The site in the tracheo-bronchial tree at which an inhaled foreign body lodges may be an important factor in determining the subsequent reaction. McCrae states that Chevalier Jackson came to the conclusion that "the finer bronchial divisions show less cough production than the larger bronchi. The peripheral areas show no cough reflex unless possibly the pleura is irritated by pressure." It may be that this comparative absence of cough is associated with a correspondingly scanty production of bronchial secretion. If this is so, the absence of excessive secretion may be a factor in lessening the tendency to secondary infection in the case of foreign bodies impacted in the finer bronchial divisions.

The Revised Diagnosis.

With reference to the erroneous tentative diagnosis of "fourteen day old, primary hydatid cyst of the lung", more mature reflection made it clear that there were two strong points of negative evidence against the diagnosis: (i) the situation of the foreign body—namely, in a small bronchus; a hydatid embryo is deposited in the lung by the blood stream, hence it would not be likely to be lying so clearly within a bronchus; (ii) the fact that a hydatid embryo becomes vesicular before it reaches the size of the present specimen.

Acknowledgements.

I am indebted to Dr. Rupert Willis and to Professor Peter MacCallum for their help, and to Mr. A. W. Jessep (Director) and Mr. P. F. Morris and Mr. J. H. Willis, of the National Herbarium, Melbourne, for the microbotanical report. The photomicrographs were prepared at the pathology department of the Alfred Hospital (through the kindness of Dr. R. Willis) from a section cut by Mr. William Sorrell, technician to the Ballarat Base Hospital.

References.

(1) T. McCrae: "Clinical Features of Foreign Body in Bronchus", *The Lancet*, Volume I, 1924, page 735.
(2) H. Marshall Taylor: "Endoscopic Removal of Sand Spurs from Larynx and Tracheobronchial Tree", *The Journal of the American Medical Association*, Volume LXXVII, 1921, page 685.
(3) H. R. Dew: "Hydatid Disease."

Reviews.

VITAMINS IN PRACTICE.

THAT the time had come for vitamin therapy to take a more prominent part in medicine was the belief which in large measure prompted the writing of the scholarly summary presented in "The Vitamins in Medicine" by Franklin Bicknell and Frederick Prescott.[1] A bold and successful attempt has been made to give a veritable cyclopædia of vitamin chemistry, physiology, pathology and clinical application evincing balanced judgment and critical restraint. "It is useless to expect too much of vitamin therapy. Even its most ardent advocates, for instance, do not pretend that vitamin B_1 is a specific for non-nutritional neuritis; that nicotinic acid will cure deafness; or that vitamin *E* is a specific for all forms of abortion." Nevertheless a perusal of this volume will convince the medical reader that vitamin deficiency is bringing more patients to his surgery than he has hertofore imagined and that the administration of vitamins by acting directly or as ancillary to other procedures can be of definite assistance.

There is a tendency, particularly in America, for authors of digests and summaries to rely on extraneous library or professional bibliographers' assistance and to present the results of research without critical editing and with unconvincing equality of emphasis. There is just a little, a very little, of this in the book now considered; one finds occasionally the phrase "on the other hand" followed by directly opposing conclusions; but by far the largest portion of the work shows that the authors have digested the material and have made a judicial summing up in controversial matters. There are here and there rather sharp comments. It is refreshing to read: "Much of the work on vitamin *C* and carbohydrate metabolism has been uncritical. . . . The fallacies are quite obvious." This is followed by a calm exposition of the grounds for this verdict. Vitamin investigation, despite the war, is active in many countries and the rapid progress it displays makes it impossible for any published book to be up to date. For example, the latest reference to Armand Quick under vitamin *K* is dated 1938. Still this volume places the reader in such a position that all the study he requires for full scholarship in the subject will be in the periodical literature of the last three or four years. There is one conclusion which will cause surprise and is likely to be challenged: "There is little vitamin *E* in the average English diet . . . for the poor this is a tragedy; even for the rich the loss of vitamin *E* is not easily made up by other foods." One would surmise from this that the fertility of the poor was lower than that of the well-to-do; alas, the exact opposite is the case. There are a few minor slips which have missed the proof-reader, such as McCallum for McCollum on page 6. This book can be warmly commended as one which can be accepted as a valuable work of reference.

[1] "The Vitamins in Medicine", by Franklin Bicknell, D.M., M.R.C.P., and Frederick Prescott, M.Sc., Ph.D., A.I.C., M.R.C.S.; 1942. London: William Heinemann Medical Books Limited. 9½" × 6½", pp. 669, with many illustrations. Price: 45s. net.

LEUCHÆMIA IN ANIMALS.

THE problem of leuchæmia in animals is one of considerable importance, from both the academic and economic points of view. A monograph, which has been written by Dr. Engelbreth-Holm at the request of the Scientific Advisory Committee of the Lady Tata Memorial Trust, presents an admirable review of the literature and of the present state of knowledge in this field of comparative medicine.[1] The monograph has been published in a most attractive format with excellent illustrations and clear print. It exemplifies the true international aspect of scientific research, for the volume was written by a Dane and published in Britain through the generosity of an Indian.

The spontaneous leuchæmias of birds and mammals, including the laboratory animals, are considered first. This section is an admirable critical review of the literature, which is dispersed widely. Leuchæmic conditions of the domesticated animals and birds are fortunately not as common in Australia as in some other parts of the world. Fowl leuchæmia is fairly widespread and causes considerable economic loss in Australia. Lymphogenous leuchæmia is not uncommon in dogs in Sydney, but a similar condition of cattle, which is a serious disease in parts of Europe and Africa, has not been reported in Australia.

The main portion of the book deals with attempts to transmit leuchæmias in various species. Particular attention is given to fowl leuchæmia, which has recently been transmitted to susceptible birds by cell-free filtrates. Work on the transmission of leuchæmia in the larger domestic animals has been less successful and the results are often difficult to interpret. However, the work on rodent leuchæmias is well established. The role played by heredity in this connexion is reviewed and support is given to the views, long held by veterinarians on clinical grounds, that there is a marked hereditary disposition to leuchæmia.

The experimental production in laboratory animals of these leuchæmias by means of carcinogenic compounds, both benzene derivatives and sterols, is reviewed, and finally the relation of animal leuchæmias to similar diseases in man is briefly considered.

The book shows how closely the fundamental problems of human and animal disease are interlocked, and how fruitful collaboration between workers in human medicine and veterinary science may become. The wealth of detail given throughout the book and the critical evaluation of interpretations by various authors on cellular changes and transmission experiments make the work invaluable to the experimental pathologist, while the review of the spontaneous leuchæmias of the domestic animals is of great interest to the veterinarian and the comparative pathologist. Dr. Engelbreth-Holm and the Trust are to be congratulated on the production of such an excellent monograph in a difficult field of comparative medicine.

[1] "Spontaneous and Experimental Leukæmia in Animals", by Julius Engelbreth-Holm, M.D., translated from Danish into English by C. L. Heel; 1942. Edinburgh: Oliver and Boyd. Medium 8vo, pp. 260 with 44 illustrations. Price: 15s. net.

The Medical Journal of Australia

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GROUP PRACTICE.

In most of the plans that have been made in recent months and in almost all the discussions on the future of medical practice, group practice has been advocated. At the recent meeting of the Federal Council of the British Medical Association in Australia group practice initiated by the members of the profession themselves was included among the means that might be adopted to make the present method of medical practice suitable for the changing needs of today. But the term group practice, like many another, has a different meaning for different people. The Federal Council found it hard to define and appointed a committee to make its way easier. The report of the committee was reproduced in our account of the Federal Council's meeting. One member of the Federal Council referred to a simple partnership arrangement made between medical practitioners in a country town for the more convenient running of their practices as an example of group practice, but he was taken to task by another who held that it was the benefit to the patient that had to be considered. Reference was made to health centres and to the interim report of the Medical Planning Commission, and the President remarked that every health centre was a group centre, but that every group centre was not a health centre. In the end it was agreed that group practice implied a certain degree of specialization. The principle underlying group practice in any form is cooperation, and in this regard a statement may be recalled from the Medical Planning Commission's interim report, that some of the difficulties that beset the general practitioner of today are due to the continuance of traditional individualism (doctors are essentially individualists) into an age where division of labour and cooperation are essential factors in social service. Members of the Branches are asked to read sections 61 to 69 of the Medical Planning Commission's report (THE MEDICAL JOURNAL OF AUSTRALIA, March 6, 1943, page 205). Three types of group practice are mentioned. The first is that of a health centre scheme such as would exist in a well-planned whole-time salaried service. The second is that of a group of general practitioners working at a centre rented or owned by them. The third would be the continuation of the partnership system in a health centre plan, the centre being regarded simply as a communal partnership surgery. The Federal Council has declared that a whole-time salaried basis for a nation-wide medical service is not in the best interests of the community. This means that in their endeavour to grasp the full implications of the Federal Council's decisions, members of the Australian Branches will exclude the first of the three types of group practice mentioned in the Medical Planning Commission's report. If from this point of view members will study the Planning Commission's report and also the report of the committee of the Federal Council on group practice, they will gain some understanding of the Federal Council's real intention, of what group practice means, and of the way in which it can be an advantage to both patient and doctor. It is important that medical practitioners throughout Australia should understand that group practice is not a panacea, the unintelligent and over-trustful application of which will remove mountains of difficulty.

One of the best ways of learning how a method or procedure works is to have an account based on the experience of those who have used it; as a general rule, too, the larger the number of those contributing to the document, the more reliable is it likely to be. Fortunately such an account of group practice is available. A few years ago the Bureau of Medical Economics of the American Medical Association prepared a report which was published in the form of a brochure. Much of the material had already appeared in *The Journal of the American Medical Association* in the first half of the year 1933, and it contains the answers to many of the questions likely to be asked by inquiring Australian practitioners. The report is based on the replies to a *questionnaire* that was sent to 1,949 secretaries of county medical societies asking for information about groups within their jurisdiction and the nature of the practice in which the groups were engaged. Two hundred and sixty-six secretaries reported the existence of one or more groups within their areas, the total number being a little over 500. The information is claimed to give a complete view of the attitude of the medical profession to the questions involved in group practice and its results. In support of this contention it is pointed out that the proportion of secretaries of county medical societies who stated that they were themselves members of groups was at least equal to the proportion of members of groups in these societies to non-members. What is regarded as the most outstanding conclusion is that there is no clearly defined or standardized type of group practice. "Physicians are forming groups as they have always done, according to their personal friendships, financial advantages, scientific and professional ambitions and all the other motives that led

Aristotle to call man a social animal." One of the questions asked was: "State definitely the objects for which groups are formed in your community (reduction of individual overhead expense, joint ownership of costly equipment, easier access to special consultants or for some other reasons)." Some sort of comment was made on this question by 128 secretaries; many stated several objects. Of the 128 secretaries, 88 stated that the objects sought in forming the group were those listed in the question. Eighteen emphasized the possibility of financial gain for the members. Forty-four mentioned improved relations and conditions of practice helpful to the practitioners who were members; of the forty-four, nine laid stress on the opportunity to go away for vacations or post-graduate study without disorganization of practice and loss of patients. In eleven replies "certain personal and professional conditions" which attracted practitioners to groups were mentioned. In thirty-seven replies benefits to patients were emphasized as among the objects that led to the formation of groups. In regard to the benefit of the patient, 170 replied "no" to the question: "Has group practice, as conducted in your community, contributed a practical method of providing medical service at reduced costs to the patient?"; 60 replied "yes". The question immediately following was: "In what way has group practice reduced the cost of medical service to the patient?" This was "somewhat of a leading question", but it was looked on as giving an opportunity to explain simple negative and affirmative replies to the previous question. Twelve replies stated that the cost to the patient had been increased. In spite of the 60 affirmative replies to the previous question (there were only 159 replies to this one) there were only 53 replies that might be interpreted as indicating an opinion that in some way group practice had reduced the cost of service to the patient. Thirty-eight replies mentioned reduced or no extra charges and greater facility for consultations within the group as a reason for the belief that charges had been reduced. Four groups in small cities referred to the saving of travelling expenses by the patients. Nine stated that a centralized laboratory effected a saving on the cost of diagnostic services. Four mentioned possible savings owing to a reduction of overhead expenses and an increased number of patients who could be cared for by the same staff. The affirmative replies to this question are summed up as making a slight claim for lower charges for equivalent care, but as insisting that superior facilities and extra consultation service can be furnished without extra charge. From 239 groups information was forthcoming in regard to the number of practitioners included. The 239 groups had a total membership of 1,466 medical practitioners and 96 dentists—an average of six practitioners to a group. Less than 13% of the groups had ten or more members and these included only 30% of the practitioners in group practice; 37% of the practitioners were found in groups with a membership of five or less. A minimum membership of three was required in a group and this requirement excluded many associations of two physicians which had adopted some such name as "clinic" with some of the other attributes of group practice. As a matter of fact the term group is used in this study to denote three or more practitioners "who have joined for practice and who own certain kinds of equipment aside from office space and employ lay assistants in common". It is worthy of notice that the superior publicity value of some such title as "clinic" is regarded as having been generally recognized and adopted for competitive purposes without any attempt having been made to conform to any definite standards. So-called "diagnostic clinics" which do laboratory and other work for outside practitioners were not included in the study, and about half the number of all the groups were omitted because they did not conform to a sufficient number of the standards to justify their inclusion. It should also be mentioned that although the Mayo Clinic cooperated fully in the study and furnished complete information, it was decided that, owing to its wholly unique character, its inclusion would distort all the conclusions. There were, when this report was drawn up, over 300 groups in the United States that came within the required standards; only 239 filled in the *questionnaire* in a sufficiently complete form to make it available for study. Looked at from the population basis, the groups studied show that group practice is best suited to communities of moderate size. Of the 239 groups 99 were found in centres with populations of 10,000 to 49,000; only 10 were in centres with a population exceeding 500,000; and 16 was the number for populations below 3,000. "In a large city the well known physician, particularly the specialist, builds up his own clientele and establishes relations with a large number of his confrères. The formation of a group, which could not include all those with whom he had such relations, would limit rather than extend his influence and his income. The publicity and prestige which accompany the formation of a group in a city of less than 50,000 population, where such publicity depends so much on word of mouth dissemination, is more conspicuous than in a metropolis. . . ." The question of specialization within groups is discussed. Information regarding specialists came from 223 groups and the conclusion was drawn that there was no general standard or typical make-up of groups. More practitioners specialized wholly or partially in surgery than in any other specialty, but only 197 out of 223 groups included one of these amongst its members; specialists in internal medicine were found in 133 groups; and 207 general practitioners were members of only 106 of the groups. Two remarks are made about these figures—the first, that there is no indication of a tendency of groups to become organized around general practitioners; the second is that the preponderance of surgeons raises the question of whether there may not be some justice in the charge sometimes made by critics of group practice that many groups are formed only to act as "feeders" for successful surgeons. The rather surprising statement is made that only in a minority of instances has it been possible to assemble such a body of selected specialists and adequate scientific equipment as to constitute a fairly comprehensive medical unit, capable of offering a complete medical service. That the great majority of groups do not have any such adequate representation of specialists, the reader is told, is no reflection on the character of the work done or on the individuals composing the groups, but only on the exaggerated claims that have been made for group practice—"claims that are largely based on the presumption that such comprehensive groups are typical".

While it may be true that all the observations recorded in this report from the United States would not necessarily

be applicable to Australian conditions and to Australian practitioners, they merit the most serious consideration. The motives that will influence Australian practitioners to initiate group practice are likely to be much the same as those that actuated practitioners in the United States. Australian practitioners have the additional compulsion that they are faced with the urgent need to improve the present-day methods of practice. For this reason they have to be doubly certain that they will so forge and wield their new weapon that it will be effective and acceptable to the public. Australia is served in many country areas by one man working alone in a town and in other towns by two men. Clearly group practice in the accepted sense is not for these places; for some of them other methods have been mentioned by the Federal Council. Group practice as reported in the American centres is not the concern of general practitioners to nearly the same extent that it would be in Australian country centres. Specialism in varying degrees would be introduced in Australian group practices; it would not be the dominant feature as it appears to be in the United States. Quite often it would be specialism "on the general practitioner level". The United States report shows that group practice initiated by members of the profession presents a variegated structure. Much the same kind of thing will happen in this country unless some skeleton schemes are laid down to suit different conditions and different types of centre. Whether this could be done is doubtful, but it is a matter that might be considered by the Federal Council. It seems to be taken for granted that overhead expenses will be reduced in group practices. This assumption is not necessarily correct. Rental will have to be paid for central premises and attendants will have to be paid to do work that is done more often than not at the present time by the doctor's wife. In the United States overhead expenses were as much as 40% of the gross takings, but this can be no criterion of what they would be in Australia. The financial side has not been emphasized in this discussion for the reason that the adoption of group practice by Australian practitioners has been advocated in order to produce a better medical service for the community; in other words, the patient has been made the first consideration, as he always should be. If this consideration is shown the medical service will be adequate and no undue strain will be put upon the patient's pocket. The success of group practice will depend not on its elaborate organization and business arrangements, not on the extent of its medical equipment and other trappings, but on the motives, the knowledge, the skill and the integrity of those engaged in it.

Current Comment.

REPAIR OF SEVERED TENDONS.

UNTIL an analysis of a series of cases is examined the imperfect functional results of the repair of severed tendons, especially flexor tendons in the finger, are not fully realized. Only too often in public hospitals is the care of the patient transferred after operation, and thus the surgeon may wrongly assume that at least some restoration of function occurred following the operation. Referring to the tendons in the digital sheaths, L. Teece reported that "in an experience covering some hundreds of cases of tendon injuries, I have never seen a case of successful primary or secondary suture when the point of division has actually been within the flexor sheath itself". Since this paper appeared in 1939 it has gradually been recognized that only the deep tendon in the flexor canal should be repaired. This has been followed by an improvement in results. The fibro-osseous canal is inelastic and unable to accommodate the bulk of two œdematous suture lines. Instead of worse results being obtained than previously, if such were possible, the limitation of repair to the deep tendon may be followed by complete recovery. No apparent effect is produced by the absence of a functioning superficial tendon from a finger. H. Miller[3] has recently reviewed this subject of repair of severed tendons, and, as so many other authors have reported, his analysis showed that functional results are poorest in lacerations involving the flexor tendons in the digital sheaths. On the other hand he was able to do what most other authors have been unable to do, which was to report good results in 64% of a series of 31 cases of severed flexor tendons in the fingers. By good results he meant cases in which the impairment of movement affects less than the terminal 20° of flexion or the terminal 10° of extension and with only slight impairment of strength. He attributed this degree of success to the use of general anæsthesia, a bloodless operative field, meticulous attention to the details of repair including the avoidance of repair of the superficial tendon, splinting and physical therapy. According to Miller the failures were due to infection, to prolonged or inadequate splinting, or to errors in technique or physical therapy. Repair and restoration of function must be expected to be imperfect if the opposed tendon ends are not free of foreign or suture material or if there is an impairment of the blood supply to the ends of the tendon such as might be produced by constricting circular sutures. Prolonged fixation of the interphalangeal joints in flexion will result in flexion contractures in a person without a lesion in the tendon. This is seemingly forgotten by those surgeons who, instead of advocating temporary fixation with the metacarpo-phalangeal joints fully flexed, the interphalangeal joints only slightly flexed and early movement, immobilize the fingers with all joints in the fully flexed position for long periods until stiffness of the joints is certain to develop.

The technique of suture of a digital flexor tendon has been approached from an entirely different angle by C. Bove,[4] who has reported successful results in four consecutive cases. In view of Teece's statement such a result is significant. Bove's method consists of drawing the tendon ends together into the wound, transfixing the tendon with pins through the finger well away from the wound, uniting the tendon ends with one or two simple sutures of silk, and then encasing the finger and pins in plaster. Bove recommended fixation with the finger in the flexed position; but, as already mentioned, this would seem to be contraindicated.

This short discussion has been confined to primary suture of severed flexor tendons in the digital sheaths for the reason that they present the greatest problem in tendon suture of civil life. Tendon suture in other situations causes much less worry to both the surgeon and the patient. Bove's intriguing method or more orthodox methods with attention to detail both promise success for the future. Unfortunately, we have also the problem of the treatment of war injuries of tendons which, because of the loss of tissue and delay in treatment, do not lend themselves to such hopeful prognostication.

[1] THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, 1939, page 532.
[2] *Surgery, Gynecology and Obstetrics*, December, 1942, page 693.
[3] *Medical Record*, Volume CLIII, 1941, page 94.

Abstracts from Medical Literature.

GYNÆCOLOGY.

The Use of Gonadotropins.

L. M. RANDALL (*Western Journal of Surgery, Obstetrics and Gynecology*, August, 1942) presents a general discussion of gonadotropins. They are still imperfectly understood. They are complex protein substances which cannot be isolated in pure form; the indications for their use are still debatable and the dosage is a matter of conjecture. Some gonadotropins are elaborated by the anterior lobe of the pituitary and stimulate development of the follicles of the ovary, ovulation and the development of the *corpus luteum*. Another is secreted by the chorionic villi; it differs in action both qualitatively and quantitatively from that produced by the pituitary. Gonadotropins may also be recovered from the serum of pregnant mares. The author suggests the use of the term "intrinsic gonadotropins" for those secreted by the hypophysis and the term "extrinsic gonadotropins" for those secured from other sources. He urges care in the therapeutic use of gonadotropins. Such use is really replacement therapy, with the possibility that the effect will disappear when treatment is discontinued. Stimulation of function of a gland is more rational treatment than the administration of substitutes for the products of its normal function. On the other hand, if the ovary can be stimulated to function by the administration of extrinsic gonadotropins, the resultant improved ovarian function in turn may improve pituitary function, so that the pituitary continues to produce intrinsic gonadotropins. A further complicating factor is the difficulty in selecting patients for a trial of this type of treatment. Ovarian failure may result from either ovarian or pituitary causes or from a combination of both. Intrinsic ovarian failure may occur at any age; it may progress rapidly, it may be arrested in any phase and prolonged for many years, spontaneous remissions of the condition are fairly common, and spontaneous episodes of normal function are often followed by recurrence of the deficiency. The author suggests that the same may be true in part of the gonadotropic function of the anterior lobe of the pituitary. The only reason of which he knows for the administration of gonadotropins is ovarian failure due to absence of or insufficient elaboration of gonadotropins. The diagnosis of such a condition does not depend only on recently developed complicated methods of assay for hormone substances. The result of all the investigational work is that various clinical syndromes have been differentiated from one another, and this differentiation can now frequently be made without resort to the use of the methods that first made the differentiation possible. A carefully taken history and thorough physical examination combined with simpler laboratory tests will often give the correct diagnosis. The function of the anterior lobe of the pituitary is peculiarly dependent on hygienic factors; consequently functional failure is seen in a wide variety of conditions. Estimation of the basal metabolic rate is advisable, since a lowered rate without myxœdema is very common. Careful examination of the pelvic viscera is essential. Failures of the endometrium are frequently corrected by the administration of œstrogens and progesterone. The author concludes that, although such a preparation does not exist at present, it is likely that a safe, uniformly potent preparation will ultimately be developed for use in selected cases as an extrinsic gonadotropin for the stimulation of the human ovary.

Retrodisplacements of the Uterus.

LEWIS C. SCHEFFEY (*Western Journal of Surgery, Obstetrics and Gynecology*, November, 1942) discusses retrodisplacements of the uterus. Congenital retroflexioversion is not uncommon; it is generally symptomless unless accompanied by complications. When the uncomplicated condition is discovered, care must be taken in the ascribing of symptoms to it and even in the discussing and explaining of such a diagnosis; otherwise an unfortunate mental state may result. When an acquired retrodisplacement is discovered, its significance with regard to the symptoms of which complaint is made must be carefully evaluated. Accompanying pelvic lesions (inflammatory or neoplastic) must be taken into account and extrapelvic causes excluded. The most outstanding symptom is generally lumbo-sacral backache, absent in the morning and increasing in intensity towards the close of the day, especially if the patient is bodily active. In the typical case rest in the prone position usually gives relief. Other symptoms may include radiation of the pain down the back of the legs, a sense of heaviness in the pelvis, bearing-down sensations and menstrual disturbances such as menorrhagia and dysmenorrhœa. Accompanying pelvic abnormalities may aggravate the symptoms. Possible extrapelvic causes of backache should be thought of and excluded before the retrodisplacement is given the sole blame for the symptoms. Successful treatment presupposes an accurate diagnosis. During the child-bearing period non-operative treatment is to be preferred. If the displacement is not too pronounced and no prohibitive complications are present, conservative management may produce symptomatic relief and even complete cure. The uterus may be replaced in position manually and kept there by means of a suitable pessary. The assumption of the knee-chest position is a useful aid. Operative treatment is called for if the patient is elderly, or if for some reason the pessary cannot be satisfactorily worn. If the patient is still in the child-bearing period, an operation must be chosen which will interfere least with parturition.

The Incidence of Trichomonas Vaginalis.

E. KUITUNEN-EKBAUM AND E. M. MACDONALD (*Canadian Public Health Journal*, December, 1942) have examined for the presence of *Trichomonas vaginalis* 300 women attending different clinics at a hospital in Toronto, Canada. Swabs were taken from the cervix of 300 subjects and from the rectum and mouth of 96 patients. A sample of blood was examined from 58 patients. Cultural methods were used on the material from the cervix of 86 women. *Trichomonas vaginalis* was found in 112 of the 300 instances; it was present in 61% of the patients attending the clinic for the treatment of syphilis or gonorrhœa, in 30% of those attending the gynæcological clinic and in 21% of those attending the obstetric and "post-natal" clinics. The organism was associated with vaginal discharge in 101 cases and with no discharge in 11 instances. In 117 cases a discharge was present in the absence of *Trichomonas vaginalis*. The organism was present in 25 of 46 patients suffering from gonorrhœa, in 11 of 17 suffering from syphilis and in 22 of 32 suffering from both diseases. The ages of the patients ranged from fourteen to sixty-five years; the organism was not found in any patient aged over forty-eight years. Of 76 pregnant women examined, 24 were found to harbour the organism. Examination of cervical, rectal and mouth swabs from 96 patients revealed *Trichomonas hominis* in four instances, *Trichomonas tenax* (buccalis) in one instance and *Trichomonas vaginalis* in 31 instances. Two women harboured both *Trichomonas vaginalis* and *Trichomonas hominis*, two harboured *Trichomonas hominis* only and one harboured *Trichomonas tenax* only. No trichomonads were found in samples of blood taken from 58 patients. Culture on blood-agar plates of cervical material from 86 patients yielded various organisms. No correlation was found, however, between these organisms and the presence or absence of *Trichomonas vaginalis*. "Stovarsol" was found to be effective in the treatment of patients harbouring *Trichomonas vaginalis*.

Adenomyosis of the Uterus.

O. A. BRINES AND J. H. BLAIN (*Surgery, Gynecology and Obstetrics*, February, 1943) present a survey of the literature and a study of adenomyosis. The confusion in nomenclature and the overlapping and intermingling of distinct and separate lesions make it impossible to determine the incidence of the condition. It has no appropriate synonym; it differs pathologically from adenomyoma and endometriosis. Adenomyosis affects women in late and middle life; endometriosis affects women in their most productive years. The two lesions are rarely associated; they occupy different anatomical sites. Only when it occurs in its more severe or advanced forms is it possible to state categorically that adenomyosis is actually a pathological state, and not merely a minor deviation from normal. It is not a potentially malignant lesion; it is but rarely associated with carcinoma or sarcoma of the uterus, and then only incidentally. It may possibly be dependent upon ovarian influence. In adenomyosis the islands of endometrial glands are more numerous than in endometriosis, and more often situated in the inner half of the uterine wall; they often communicate with the mucosal layer. Direct invasion from the endometrium thus appears to be the mechanism of production of the lesion. From their examination of the material on which their study is based, the authors believe that they have proof that the cytogenic stroma of the normal endometrium is derived from the non-striped muscle cells of the myometrium by a process of dedifferentiation, and that the cells thus produced are less mature and possess a greater capacity or

potentiality for differentiation than the cells from which they develop. Adenomyosis results from spontaneous generation of endometrial stromal or interstitial cells from and within the myometrium; this tendency is greatest near the normal endometrium and decreases towards the serosa. The stromal or interstitial cells produced in this way later differentiate to form the gland cells of the endometrium. The so-called stromal or interstitial cells are really parenchymal cells; they possess a finely distributed true stroma.

OBSTETRICS.

Vitamin E in Habitual Abortion and Habitual Miscarriage.

EVAN SHUTE (*The Journal of Obstetrics and Gynæcology of the British Empire*, October, 1942) discusses the use of vitamin *E* in habitual abortion and habitual miscarriage. He differentiates abortion, as pregnancy terminating at or before the sixteenth week of pregnancy, from miscarriage, as that terminating between the sixteenth and twenty-eighth weeks. In his analysis of cases, he does not find vitamin *E* so efficient as some other writers; some of these claim 76% success in habitual abortion and 96% success in cases of habitual miscarriage. The author states that in his experience better results were obtained in miscarriage than in abortion, and that the earlier in pregnancy the habit showed itself, the more hopeless the outlook seemed to be. He has had 35% success with women suffering from habitual abortions and 60% success with those who had true habitual miscarriages. He emphasizes the fact that habitual abortions and miscarriages must not be regarded as being due solely to vitamin *E* lack, but that thyreoid deficiency and œstrogen excess and also spermatozoal deficiency or abnormality may be factors in some cases.

The Treatment of Disproportion Associated with a Moderate or Slight Degree of Pelvic Contraction in Primiparæ.

VIVIAN H. BARNETT (*The Journal of Obstetrics and Gynæcology of the British Empire*, October, 1942) discusses the advantages and disadvantages of trial labour and induction of labour in cases of contracted pelvis of the first degree, that is, when the true conjugate is not greater than four inches, nor less than three and a quarter inches. The author reaches the conclusion that, when X-ray pelvimetry reveals pelvic contraction with first degree disproportion, at or after the thirty-sixth week, labour should be induced. Trial labour is considered to be indicated when there is pelvic contraction but no disproportion, or suspected disproportion but no demonstrable pelvic contraction. He considers that elective Cæsarean section should be reserved for those cases of contracted pelvis in which disproportion of the second or of a greater degree is present. In a series of 111 cases from the University College Hospital, induction of labour showed a fœtal and neonatal mortality of 11·7% and maternal morbidity of 9% with one maternal death from sepsis. Bougies were mainly used as the method of induction. The results from 57 cases of trial labour showed a fœtal and neonatal mortality of 15·8% and maternal morbidity of 12·3%, the one maternal death occurring being not due to the method of delivery. The author is of the opinion that an improvement upon the induction results of the past would be obtainable by: (*a*) X-ray pelvimetry added to the clinical estimation of pelvic contraction, and (*b*) the use of the Drew-Smythe catheter in the performance of the induction.

Morphine Sulphate as an Obstetric Analgesic.

WILLIAM F. MENGERT (*American Journal of Obstetrics and Gynecology*, November, 1942) discusses morphine sulphate as an obstetric analgesic. His figures confirm the fact that the administration of morphine during the second and third hours preceding delivery is attended by the highest percentage of fœtal difficulties, but during the first hour and after the third or fourth hour the effects of the drug on the fœtus are minimized. The vast majority of figures quoted show that morphine alone and in combination is associated with the highest percentage of respiratory and circulatory difficulties at birth and of fœtal death, and that a considerably larger percentage of low forceps operations is necessary in the treatment of those patients who receive morphine than of those to whom other analgesics are given. Fœtal deaths are quoted as being highest in those cases in which morphine was used in the third hour before birth, particularly in cases of premature birth. The author reaches the conclusion that, whilst morphine during pregnancy in therapeutic doses does not exert a deleterious effect upon the *fœtus in utero*, its employment as an obstetric analgesic is not without considerable risk of post-natal fœtal respiratory difficulty which, however, can as a rule be combated by usual resuscitative measures.

The Ætiology and Prophylaxis of Prothrombin Deficiency and Hæmorrhagic Disease in the Newborn.

A. I. S. MACPHERSON (*The Journal of Obstetrics and Gynæcology of the British Empire*, August, 1942) reports his observations on prothrombin deficiency and hæmorrhagic disease in the newborn. After stating the method of estimation of prothrombin, the author considers the influence of diet, toxæmia, prematurity, and prolonged labour in relation to prothrombin deficiency. The richest source of vitamin *K* in nature are green vegetables, such as beans, spinach and cabbage; milk and egg yolk contain a small amount; root vegetable and fruits none at all. The ideal diet according to Mellanby is two pints of milk, two servings of green vegetable, one to two eggs, fresh fruits, cod liver oil, with sea fish three times a week and liver once a week. However, for the purpose of this investigation a diet was considered to be deficient either when one item rich in vitamin *K*, for example, green vegetables or milk, was completely absent, or when one or more factors were seriously deficient. It was found that in 24 patients who had an adequate diet the prothrombin level had the usual drop to the lowest point between forty-eight and seventy-two hours after delivery and recovered by the fifth day; in this group there were no signs or evidence of any bleeding. A second group of 54 consecutive patients in whom the diet was not investigated showed a lower starting point and had a prothrombin level which was 10% lower; they were slower to recover. In a third group in which the diet was inadequate the prothrombin index was very low, clinical symptoms of cerebral irritation developed in three babies and at autopsy blood was found in two; there were six cases of hæmorrhagic disease, all of which began within the first four days of life. It was found that toxæmia *per se* did not influence the prothrombin, and comparison of the curves for three degrees of toxæmia showed that there is no correlation between the severity of the illness in the mothers and the extent of the prothrombin deficiency in the infants. With prematurity there is no significant alteration in the prothrombin index, but the metabolism of vitamin *K* is more liable to be delayed or upset by alimentary or other disturbances to which a premature baby is prone. Prolonged labour had no effect when the diet was adequate, even when labour was terminated instrumentally. However, three cases are discussed, and on a basis of these it is thought that chloroform affects the child's liver and that when this is already handicapped in the formation of prothrombin by lack of vitamin *K*, it is further impeded by imprudent administration of chloroform and the only evidence of any toxic effect is likely to be profound neonatal hypoprothrombinæmia. Neonatal investigations were carried out on four hydrocephalic babies and it is shown that the initial fall is the same when the diet is poor; but it goes on falling, which suggests that, in the absence of dietary source, the bacteria present in the alimentary canal cannot provide a supply of vitamin *K* sufficient to balance the normal physiological destruction of prothrombin. It was further noted that when the antenatal diet of the mother had been full and adequate the prothrombin index in the infant did not fall so low at the end of three weeks as it did in three days in the offspring of mothers whose diet had been deficient.

Hypertension in Pregnancy.

R. D. MUSSEY, A. B. HUNT AND F. S. SLUDER, of the Section of Obstetrics and Gynecology of the Mayo Clinic (*American Journal of Obstetrics and Gynecology*, February, 1943), discuss the question of hypertension in pregnancy. In a series of 297 cases of toxæmia of pregnancy amongst 5,207 labours conducted in a ten-year period, there was an incidence of hypertensive toxæmia of 5·7%. Of the 24 patients who had eclampsia, 79% had not received ante-natal care. The authors summarize the general principles in the management of toxæmia as follows: rest and sedation, a diet poor in salt, rich in protein and relatively poor in fat and carbohydrate, increase of fluid intake unless oliguria persists, admission of the patient to hospital before the process becomes severe, shortening of the course of the pregnancy when necessary, and conservatism in the management of childbirth.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Section of Neurology, Psychiatry and Neurosurgery of the New South Wales Branch of the British Medical Association was held on September 17, 1942, at the Mental Hospital, Callan Park. The meeting took the form of a discussion of cases of mental disorder among soldiers.

Mental Disorder among Soldiers.

DR. A. T. EDWARDS said that before any patients were shown he wished to explain the *raison d'être* of the meeting. He referred to remarks made by D. Cohen and E. Mallinson. They had pointed out that the economic use of manpower was increasingly important, and that psychiatrists had to ensure, as far as possible, that men likely to break down or to prove ineffective should not be accepted as recruits, or, if they had been accepted, they should be eliminated from the forces at the earliest possible moment. Cohen and Mallinson had further said that, of their large number of cases of mental disorder, 39% were regarded as predictable breakdowns, and there was a high proportion of neurosis, psychosis or psychopathic conditions in the past histories. They held that economy in available manpower would be achieved by the taking of a fuller history from recruits and by the psychiatric investigation in the first four weeks of training of all "doubtful" recruits and of all unsatisfactory trainees. Dr. Edwards went on to say that it was considered that 45% of the psychiatric casualties in the Canadian army during the first year of the war would have been predictable if a psychiatric unit had existed in that army. The Germans had realized the importance of psychological organization, to such an extent that the psychological unit in their army was stated by the American Committee of Investigation to have been for years considered equal in importance to any other branch of the service.

With regard to the 178 casualties admitted to the Mental Hospital, Callan Park, during the war, from the navy and the army, Dr. Edwards said that there were three most important factors which it was thought should have led to the rejection of a recruit or to his psychiatric investigation while he was in camp. They were: (i) a history of previous admission to a mental hospital or of a previous "nervous breakdown"; (ii) mental deficiency; (iii) the existence of an introspective, sensitive, "shut-in" personality. The third characteristic had been found in a large proportion of the younger patients admitted to the hospital from camps in New South Wales. Psychopathic change, which was much beloved by American authors as early evidence of mental disorder, had been very rare.

Dr. Edwards further said that patients such as the ones about to be shown were a menace in the army, and a source of expense to the community whilst they were in hospital and probably after their discharge. They retarded training and destroyed morale while they were in the army; neurosis was extremely infectious. The recruiting of such patients led to loss of manpower, which would otherwise have been available in civilian occupations. They were associated with an economic loss during the period of training and probably with a recurring loss after the war, on account of the need for pensions.

Dr. Edwards then discussed several patients. The first was a single man, aged twenty-eight years. His cousin and aunt were in the hospital. His mother had previously been in Broughton Hall, and she was admitted to the hospital while the patient was there. In 1940 he had spent eight months in the hospital, suffering from paranoid schizophrenia with persecutory delusions and abusive hallucinations. In December, 1941, he was called up for the Australian Military Forces; he became hallucinated and was readmitted to hospital on February 3, 1942, with delusions of grandeur. He was discharged from hospital on March 24, 1942, and at the time of the meeting was said to be in the Second Australian Imperial Force.

Dr. Edwards's second patient was aged forty-one years. There was nothing of importance in his family or early history. He had been a foreman in the railways until 1935. He was made storeman on account of "fainting fits", and in 1939 he was discharged as medically unfit because of these so-called "fainting fits", which were obviously due to *petit mal*. He enlisted in the Second Australian Imperial Force in January, 1941, and was discharged as medically unfit after three months. He reenlisted in September, 1941, and was again discharged. During the past three years he had suffered from frequent epileptic seizures, and he said that during his periods in the army he had had at least one such seizure per week.

The third patient whose case was discussed shown by Dr. Edwards was aged thirty-one years. His mother was "schizogenic", and there was a history of a broken home; the father finally deserted the mother when the patient was aged fifteen years. The patient was never able to keep a job for long, having always been considered "unsuitable"; he was of the roving type. He had been in Broughton Hall in 1937 for three months, suffering from schizophrenia, and was discharged "relieved". He enlisted in the Second Australian Imperial force in October, 1939, became psychotic and was admitted to hospital in December, 1939, with a delusion that someone was taking away his sexual powers. He had obviously been psychotic from the time that he was admitted to Broughton Hall.

Finally, Dr. Edwards discussed the case of a patient, aged twenty-two years, whose parents were excitable, though not psychotic. He had reached the lower fourth class at school when aged fourteen years. Up to the time when he left school he was always irresponsible and could never concentrate. In 1940 he was twice admitted to Broughton Hall, suffering from schizophrenia. He enlisted in the Second Australian Imperial Force in September, 1941, and reached Malaya; he became psychotic and was sent back. He was certified insane on June 5, 1942. He remained irresponsible, foolish, dull and absorbed in foolish ideas concerning psychology and puberty. He was taken on leave by his mother early in 1942, and stated that he intended to rejoin the Second Australian Imperial Force.

DR. C. HENRY discussed the cases of several soldiers, who had either been certified patients in mental hospitals before being accepted for the army, or had after enlistment exhibited such unmistakable signs of mental disability that they should at once have been discharged. Dr. Henry drew attention to the fact that in the forms used for the enrolment of recruits, although the question was asked, "have you ever suffered from neurasthenia or nervous breakdown?", the recruit was not asked whether he had ever been a patient in a mental hospital. In view of the cases he was about to discuss, Dr. Henry thought it imperative that such a question should be added to the form used. Dr. Henry had been furnished also with an appendix to the book of instructions issued to area medical officers as an aid to the discovery of cases of mental abnormality among recruits. The appendix directed attention to such things as general awkwardness, untidiness, antagonism to discipline, oddity of behaviour, sex perversions, characteristics making a recruit the butt of his comrades, frequent attendance at sick parades, and so on. Dr. Henry suggested that this appendix should be furnished to all medical officers, all junior executive officers and all non-commissioned officers, with instructions that men showing such characteristics should be reported to the proper authorities with a view to their examination by a psychiatrist. In this way the great losses of time, equipment, training and manpower, which resulted from the recruiting, training and sending to battle stations of mentally unstable men, would be avoided; so would the resultant claims for pensions, which were very often successful and so caused needless expenditure to the Commonwealth and incidentally to the general population.

The first patient whose case was discussed by Dr. Henry had been admitted to the hospital in August, 1929, suffering from schizophrenia; he was discharged in March, 1931. He was readmitted to hospital in June, 1934, and discharged in July, 1934; he was readmitted again in November, 1939, and discharged in October, 1940. In 1941 the patient was accepted for the Royal Australian Air Force. He became maniacal and made unreasonable demands for leave for all troops.

Dr. Henry's second patient was a methylated spirit drinker, who had been in jail several times. He had been admitted to another mental hospital in August, 1934, suffering from schizophrenia, and discharged in March, 1936. He enlisted in the Second Australian Imperial Force and underwent training; but he became depressed, assaulted his mates and was certified insane.

Dr. Henry's third patient had been certified insane in August, 1939; he was then suffering from paraphrenia. He was discharged from hospital in December, 1939. In 1941 he enlisted in the Second Australian Imperial Force, became aggressive and was again certified insane.

The fourth case discussed by Dr. Henry was that of a patient who had been certified insane in July, 1937, when suffering from schizophrenia; he was discharged from hospital in October, 1939. He enlisted in the Second Australian

Imperial Force in 1940 and went to England; but he gave way to the temptations of alcohol and was sent back as a mental patient.

The fifth patient was a single man, aged forty-one years, who had served in the war of 1914-1918 and had been severely wounded in the head. In 1939 he began to have fits, but was accepted by the army and served at Tobruk. He was sent back as a mental patient, and died in the hospital of epilepsy in April, 1942.

The sixth patient whose case was discussed by Dr. Henry was a single man, aged twenty-seven years. He had been a patient in another mental hospital on four occasions before being accepted by the army in October, 1941.

The seventh patient, a single man, aged twenty-six years, had been admitted to a mental hospital in June, 1929, suffering from schizophrenia; he was discharged from the hospital in April, 1932. In May, 1933, he was admitted to another mental hospital. He was accepted for the Second Australian Imperial Force, but required certification in December, 1939.

The eighth patient was a single man, aged twenty-eight years, who had been admitted to the hospital in November, 1937, suffering from schizophrenia, and discharged in November, 1938. He was accepted by the army in 1941, but became maniacal and was again certified insane.

The ninth patient was a married man, aged twenty-three years, who had been admitted to the hospital in May, 1940, suffering from schizophrenia. He was discharged in July, 1940. The patient had previously been in another mental hospital in 1933, 1937 and 1938. He enlisted in 1941, became maniacal in camp and was recertified insane in August, 1941.

Dr. Henry's tenth patient was a single man, aged thirty-five years, who had been admitted to the hospital in July, 1942, suffering from schizophrenia. His father had been a patient in a mental hospital, his mother was insane, and he himself had always been mentally retarded. He was accepted by the army in October, 1941, and went to Port Moresby; but he had to be certified insane and sent back to enter the hospital.

The eleventh patient was a single man, aged thirty-eight years, whose mother was subject to fits and had a nervous breakdown and whose father was an alcoholic. The patient himself had been a poor scholar; he was unable to learn and had a speech defect. At the age of sixteen years he received the invalid pension for mental deficiency and had drawn it ever since. He had been subject to fits since the age of ten years. Whilst in receipt of the invalid pension he was passed as fit for military service and sent to camp.

Dr. Henry's final patient was a single man, aged twenty-one years, who had been a poor scholar. He could never keep a job and was obviously mentally deficient. In 1939 he was accepted by the army. He served in Darwin, and was sent back as a mental patient.

A MEETING of the South Australian Branch of the British Medical Association was held on November 26, 1942, at the Royal Adelaide Hospital, Adelaide. The meeting took the form of a number of clinical demonstrations by members of the honorary medical staff of the hospital.

Carcinoma of the Lung with Secondary Deposits in Bones.

DR. J. G. SLEEMAN showed a woman, aged fifty-two years, a florist by occupation. She had been perfectly well until four years previously; at that time she was unfortunate enough to fall down the stairs into a cellar, injuring her right shoulder. Ever since the accident the shoulder region had been painful; in fact, the pain had become progessively more severe and had been accompanied by increasing disability in the use of the arm. She could carry out any movement at the elbow, wrist or fingers, but could scarcely use her arm. She had lost strength generally and weighed two stone less than twelve months earlier. She had been obliged to abandon employment to seek relief. There were no other symptoms. The patient was rather thin, but her colour was good. The only abnormalities to be found on physical examination were two rounded, tender bosses in the skull, about the size of a small cherry and in the left parietal region. The apex beat of the heart was felt in the fifth intercostal space in the axillary line; the sound, the rate and the rhythm were normal and the right cardiac border could be percussed under the sternum. Dulness to percussion and diminution of breath sounds were present at the base of the left lung, but no other abnormality was detected. In the right shoulder region the atrophied edge of the trapezius could be readily felt, and there was no swelling anywhere. No enlarged glands could be felt in the neck or axilla. No movement was possible at the shoulder joint; the sole movement of the arm was due to movement of the scapula on the ribs. X-ray examination of the chest revealed displacement of the heart and mediastinum to the left and a diffuse, dense haze over the lower part of the left lung, which was either fibrotic or atelectatic in nature. In the absence of a history of previous severe inflammation of the lung, it was assumed that the diffuse opacity was due to atelectasis. X-ray films of the shoulder joint revealed that the head of the scapula presented the appearance of having been worm-eaten; innumerable communicating dark spaces, evidently due to loss of bone, were to be seen on the films. There was no evidence of attempt at repair. The bosses on the skull presented the same X-ray appearance.

Dr. Sleeman said that the diagnosis of carcinoma of the lung with secondary deposits in the scapula and skull had been made. He admitted that perhaps more rigid proof might be desirable that the atelectasis of the lung was due to an endobronchial cancer; but the performance of bronchoscopy in such cases had in his experience often been unsatisfactory, in that no growth could be seen and in addition the patient had been unduly distressed by the operation. However, he believed that atelectasis was much more often the cause of deviation of the mediastinum than was fibrosis, and that in the present case the cause of the atelectasis was endobronchial. The X-ray appearance of the lesions in the scapular head did not resemble those of any infection; the possibility that the bony condition might be associated with a parathyreoid tumour was negatived by the normal calcium content of the blood. Taking all the data together, he thought that no other diagnosis was tenable. Dr. Sleeman went on to say that his object in showing the patient was to emphasize that lung cancer was undoubtedly becoming more common than formerly; it was interesting to see in the last issue of "The Medical Annual" that it was now running fourth to cancer of the breast, stomach and uterus. Unfortunately, however, many patients were seen too late for the performance of pneumonectomy, which was the operation in favour at the present time. The patient under discussion had had no cough, sputum or pain in the chest, nor enlarged glands in the neck or axilla, either from the primary growth or from the secondary deposits, and as the secondary deposits were so widely diffused, her prognosis was hopeless.

Spastic Paraplegia.

DR. GUY LENDON showed a married woman, aged sixty-two years, who three and a half months earlier had had some pain in the ball of the left foot, and soon afterwards in the right great toe. On her admission to hospital her legs were stiff and heavy rather than painful. Just before her admission she found that she could not lift the right foot, and it dragged on the ground. Soon after the legs were affected. A tight feeling around the abdomen was noted, but this quickly disappeared. She had not lost weight and had retained full control of micturition and defæcation. Seven years earlier the uterus had been treated with radium; the patient believed it was for malignant disease.

Examination revealed an upper motor neurone lesion of both pyramidal tracts; the plantar and crossed plantar reflexes were extensor in type, and left-sided clonus was present. The arms were unaffected. Special examination of the blood, gastric contents and cerebro-spinal fluid had failed to reveal any abnormality. The blood serum did not react to the Wassermann test, and X-ray examination of the spine revealed no abnormality. A little, though very little, recovery had taken place in the right leg since her admission to hospital. There were no objective sensory changes.

Disseminated Sclerosis Associated Chiefly with Signs of Spastic Paraplegia.

DR. M. E. CHINNER showed a female patient, aged forty-four years, married; she was a tailoress. Fifteen years earlier she had noticed double vision on several occasions and had been unable temporarily to carry on her sewing. Seven years prior to the meeting she had noticed weakness and some sensory changes in the right arm, which had never completely recovered. Four years prior to the meeting she noticed that she was dragging her left leg; she fell down, and was unable to get up. This state of difficult walking had remained, and now the right leg was giving trouble. She had both precipitate micturition and precipitate defæcation.

The main points disclosed on examination were weakness of both legs and thighs, more pronounced on the left side, absence of the abdominal reflexes, hyperactivity of the knee jerks, and the fact that the plantar reflexes were both extensor in type. The ankle jerks were not elicited, owing to extensor spasm.

A Urethral Stricture with an Unusual Cause.

DR. G. H. BURNELL discussed the case of a male patient, aged fifty-six years. At the age of five years, while playing with other little boys, he had had a piece of string tied around his penis by one of the other boys. He was unable to void urine for twenty-four hours, during which period he suffered much pain. He did not tell his parents, and after twenty-four hours the urine "burst through". Ever since then he had had much trouble with his urine, passing only a very poor stream.

On examination, one could see a narrow scar surrounding the penis about one inch behind the *corona glandis*, while palpation revealed a thickening beneath the scar. Dr. Burnell thought it might possibly be due to some string still present in the subcutaneous tissues, or that it might be merely scar tissue replacing the string. One could also feel a thickening of the urethra for about half an inch of its length in that region. Urethroscopic examination revealed a fine-calibre stricture about one inch from the external meatus (the patient had slight hypospadias), the lumen of the stricture being about one-sixteenth of an inch.

Sycosis Barbæ with Malignant Change.

DR. D. G. MCKAY showed a patient suffering from *sycosis barbæ*. It had become necessary to remove portions of the skin, in which malignant change had occurred. The areas were treated by Thiersch skin grafts, and the result appeared satisfactory.

Calcification of the Supraspinatus Tendon.

DR. W. JOLLY showed a patient who had sustained a fall about five years earlier; the supraspinatus tendon had become calcified, and the shoulder was stiff and painful. Dr. Jolly said that adhesions were usually a more potent cause of stiffness than calcification, and that many patients with this condition derived great benefit from manipulation.

X-Ray Films.

DR. K. S. HETZEL showed a number of X-ray films of spinal conditions, including secondary carcinomatous deposits and sarcoma.

VICTORIAN BRANCH NEWS.

THE following letter sent by the Victorian Branch of the British Medical Association to the Liquid Fuel Control Board is published at the request of the Medical Secretary of the Victorian Branch.

The Chairman,
Liquid Fuel Control Board,
Exhibition Buildings,
Rathdown Street,
Carlton, N.3.

Dear Sir,

I am directed by the Council of the Victorian Branch of the British Medical Association to convey to your Board its protest against the decision to reduce the petrol rations of medical practitioners and compel them to use "wet alcohol".

Evidence collected by this Association indicates that—

(i) "Wet alcohol" is an unstandardized product containing from 3% to 6% of water and, as its water content is not governed by any legal standards, mixtures of "wet alcohol" and petrol will vary in stability and efficiency.

(ii) A motor car will run on a 50/50 mixture of "wet alcohol" and petrol with the following disadvantages:

(a) The necessity for altering carburetter jets (large sizes are required for "wet alcohol"-petrol mixtures) and the level of the carburetter float.

(b) Difficulty in starting, especially in cold weather, when "priming" of the engine with petrol may be necessary.

(c) Certain damage to the petrol pump diaphragm which, sooner or later, will become pervious to the "wet alcohol"-petrol mixture.

(d) A "wet alcohol"-petrol mixture, when first used, will scour scale, rust *et cetera* from the petrol tank and fuel lines and cause temporary trouble by blocking jets and filters, necessitating cleaning of those parts. In addition, if cork floats on petrol gauges or in carburetters are coated with shellac, the shellac will be removed and the floats rendered inefficient.

(e) Some "wet alcohol" contains acetic acid as an impurity and will erode the die-cast alloys from which most modern fuel pumps and carburetters are manufactured.

(f) With petrol at 2/10d. per gallon and "wet alcohol" at 4/8d. to 5/-, the cost of a 50/50 mixture is approximately 4/- per gallon. With such a mixture there will be a drop in mileage compared with mileage obtainable from petrol.

(g) The fact that some "pool petrol" already contains alcohol will cause difficulty in computing percentage ratios in mixtures and, as all garages do not sell "wet alcohol", there may be inconvenience and waste of time in refilling petrol tanks.

(iii) The medical profession in Victoria is drawing ration tickets for approximately 40,000 gallons of petrol per month for use in about 1,100 cars. Reduction of that allowance by 10,000 gallons, an amount estimated to be about one-third of 1% of the civil consumption, and the issue of permits for the purchase of 30,000 gallons of "wet alcohol" would allow the use by the profession of 60,000 gallons of "wet alcohol" and petrol which, in the words of a circular letter issued by your Board, "should result in a substantial increase in monthly mileage", an increase which, in general, is not desired and which, on account of the shortage of rubber, is not desirable.

It is the opinion of my Council that, on the evidence available, medical practitioners are justified in refusing to use "wet alcohol" in their cars and that enforcement of its use would not be equitable until such time as the use of motor vehicles for non-essential purposes has been prohibited.

It is, therefore, most urgently represented that your Board reconsider its decision in the matter, as otherwise the responsibility for any impairment of the efficiency of medical services in this State, resulting from the reduction of petrol rations, must be borne by your organization.

A copy of this letter has been forwarded for publication in THE MEDICAL JOURNAL OF AUSTRALIA.

Yours faithfully,

(Signed) C. H. DICKSON,
Medical Secretary.

May 5, 1943.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on October 14, 1942, at the Children's Hospital, Carlton, Melbourne, DR. H. L. STOKES, the President, in the chair. The meeting took the form of a series of clinical demonstrations by members of the society.

Ununited Fracture of the Femur.

DR. W. FORSTER showed a boy, aged fifteen years, who had sustained a fracture of the neck of the femur on May 8, 1939, and a further fracture at the site of the old injury on January 23, 1940. He had come into the care of Dr. Forster towards the end of 1940, with the fracture ununited, considerable absorption of both fragments and four inches of shortening. By means of the insertion of a Kirschner wire and the use of eighteen pounds of traction reasonably good alignment was obtained eventually, but without union. At the end of 1940 a graft from the tibia of the other leg was slotted into position, but it had proved difficult to control. After several months the tibial graft was firmly united at the lower end, but at the upper end the femoral

fragment had melted further and further away, until there was a real danger of perforation of the ileum by the tibial graft, which had become quite pointed.

Dr. Forster said that treatment had been a complete failure, and he asked for advice concerning what he should do next. He recalled two previous somewhat similar cases, in which in the hands of first-class surgeons the fractures had taken five and six years to unite; but in the present instance he had no indication of a favourable outcome at any future date.

DR. H. DOUGLAS STEPHENS said that amputation offered the best chance; the left leg, though stiff and wasted, would then recover, and the boy would be able to be usefully occupied.

DR. E. E. PRICE expressed the opinion that an intrinsic factor, such as a disturbance of calcium metabolism, had interfered with the regenerative power, and that three principles of treatment might be considered and a choice made of one of them. They were: (*a*) Reconstruction at the hip joint, which would be technically difficult; the upper end of the femur would have to be excised, and a great deal of bone would be needed. (*b*) Amputation at the hip joint; that was advisable, as the knee and foot were in bad shape. (*c*) To adopt a conservative attitude and do nothing. Mobility at the site of fracture would remain; but, as in an elderly person, the weight could be carried through a callipered splint. If that was not considered effective, the boy could at any time be parted from his encumbrance.

Dr. Forster, in reply, said that he had regretted that the boy had not made attempts at movement before the bone grafting was carried out; adjuvant massage and electrical stimulation might then have revitalized the site. The amount of decalcification present was seldom encountered except in chronic osteomyelitis. It seemed a dismal prospect for the lad to have to lose the leg after all that time because of a mere fracture.

Gargoylism.

DR. J. W. GRIEVE showed a male baby, aged twenty months, as an example of gargoylism. Dr. Schuller had referred the child to the hospital for investigation and had made the diagnosis. The parents were healthy and not consanguineous. They had had one other child, a girl, who had also had gargoylism, which was evident from birth and was accompanied by nasal obstruction and nasal discharge. She had been mentally retarded and had not walked till after she was two years old. She died in August, 1942, at the age of two years and three months, during the course of an attack of pneumonia.

The boy under discussion was born normally, at full term; he was of average weight. Though they were looked for carefully, the stigmata of gargoylism were not recognized. After three months it was realized that he had nasal obstruction, which had progressed, and persistent nasal discharge. He had an attack of bronchitis at the age of four and a half months. He had been able to crawl and to sit up without support at eight months, to walk with support at one year and to walk alone at fifteen months. He had, however, been unusually clumsy and apt to fall. The appearance of the head was satisfactory until, in the thirteenth month, the forehead began to increase in size, the corneæ became somewhat cloudy, veins became noticeable on the forehead and the nose was more obstructed. Kyphosis was present from the age of five months. Umbilical herniation and abdominal protuberance were features only in the second year. He had grown reasonably well, and at the time of the meeting he weighed over twenty-five pounds. Breast feeding had been maintained for seven months, in spite of the nasal obstruction; but later he had been difficult to feed with solid food. Eruption of teeth had not begun till just before the end of the first year, and only ten teeth had so far appeared. The voice was a little hoarse, and he was subject to upper respiratory infections. He could associate names with objects, but some degree of mental backwardness was apparent. He was irritable, and did not sleep well.

Dr. Grieve drew attention to the large frontal protuberance, the large fontanelle, the conspicuous head veins, the depressed nose with nasal discharge and malar flush, the bushy eyebrows and coarse features, the broad distance between the eyes, the cloudy corneæ, the narrow cleft in the hard palate and the unusual breadth and thickness of the gums. He said that the head measurements were, from ear to ear over the vertex, eleven and a half inches, and circumferentially, twenty and one-eighth inches. He then pointed out some splaying of the ribs, the protuberance of the abdomen with enlargement of liver and spleen and the umbilical hernia. The upper limbs were short; the hands were squat, the fingers trident-shaped and the thumbs peculiarly shapeless. Dr. Grieve demonstrated the limitation of extension at the shoulders, elbows and knees and the kyphosis localized in the upper lumbar region. The texture of the skin was perhaps a little rough and the hairiness was apparent. He said that the blood cholesterol content (155 milligrammes per 100 cubic centimetres), the calcium content (10·6 milligrammes) and the phosphate content (3·5 milligrammes) were within the limits of normality and that examination of the urine revealed no abnormality. The report on the examination of the blood serum had not yet been received. In conclusion, Dr. Grieve said that the case he had described was a typical example of the rare condition known as gargoylism, and that the points that had interested him particularly were the family history, the relationship to other conditions and the extremely interesting appearance of the *sella turcica* in the X-ray films.

DR. ADOLF SCHULLER said that he had had an opportunity to see the older child and to obtain skiagrams of the heads of the present two children and also of two Chinese children suffering from gargoylism. He demonstrated from the films the double nature of the elongated *sella turcica* in each case. The floor of the middle fossa was depressed and the space of the naso-pharynx became very narrow, compressing the air passages. He commented on the way in which mucus would run out when the child was placed on the face, with great relief to the breathing. He then mentioned another group of cases, in which infiltration of the tissue with fatty substances had been described in an American medical journal, and said that the name adopted for the condition in the *Quarterly Cumulative Index Medicus* was "lipo-chondrodystrophy".

DR. COLIN MACDONALD, in describing the X-ray films, said that in those of the skull the calvarium was thick, with a ground-glass homogeneous appearance. Though the anterior fontanelle was widely open, craniostenosis of the occipito-parietal suture and mild scaphocephaly were present. The supraorbital ridges were unduly prominent. The pituitary fossa was enlarged owing to malformation of the sphenoid. In the films of the spine he showed platyspondylia, most definite in the lumbar region, where the second lumbar vertebra, and to a less degree the first lumbar vertebra, were characteristically deformed with anterior hooking of the bodies. In the upper lumbar region, the characteristic kyphosis was present. In the thorax the flattening of the ribs and the enlargement of the clavicles were noteworthy. The extremities of the long bones were irregularly thickened; the acetabula were poorly formed, and a slight degree of *coxa valga* was demonstrable. Dr. Macdonald concluded that the appearances were those of gargoylism, the Phaunder-Hurler syndrome (*dysostosis multiplex*).

DR. ROBERT SOUTHBY agreed that Dr. Grieve and the other speakers had adduced all the features of gargoylism. On previous occasions Dr. Sinn and he had shown patients before the society. The familial tendency, the mental retardation and the presence of the condition in Melbourne were points of great interest. Two children had not walked and were complete aments, completely spastic, with flexed joints, and both had died of bronchopneumonia, one at the age of five years and the other at nine. The girl had had bilateral congenital dislocation of the hips. Dr. Grieve's patient was not so retarded mentally and was able to get about, but he was young, and it was already demonstrable that the ventricular system was dilated.

DR. H. J. SINN said that he had a group of five patients to discuss, but could add nothing to what Dr. Grieve had said. He was interested in the great elongation of the *sella turcica* region; as time went on the fossa became deeper. He and Dr. W. M. Smithers thought that was brought about by the hydrocephalus burrowing out and deepening the pituitary fossa. Autopsy records were scarce; but Dr. Sinn had examined the body of a small baby, aged six months. The liver and spleen were huge, and lipoid changes had occurred in the liver. He had not studied them fully, but as Dr. Schuller had inferred, gargoylism might be one of the lipoid dystrophies. The corneal opacities were characteristic; they had to be viewed at a certain angle, and they varied in depth.

Generalized Tuberculosis.

Dr. Grieve also showed a female child, aged two years and nine months, who had been under his care in the hospital since September 6, 1942. She had appeared to be well until ten days before then, when the illness had commenced with drowsiness of one day's duration, followed by apparent improvement in her condition lasting for one

week. She had become drowsy again and looked flushed, and the right arm and the right side of the face had begun to twitch. By September 6 the right arm and leg were paralysed and the child was still drowsy. Subsequently the drowsiness and weakness had gradually and steadily decreased; but the child was far from well. Dr. Grieve went on to say that the Mantoux test produced a strongly positive reaction; tuberculous chorioiditis was found on examination of the fundi, but the cerebro-spinal fluid withdrawn had not contained an increased number of cells, and the blood chloride content was not lowered (718 milligrammes per 100 cubic centimetres). Dr. Grieve then showed in skiagrams an area of impaired transradiancy near the hilum of the right lung and the presence of miliary tubercles; he commented on the excellent detail and definition obtained by the use of the rotatory anode tube. No abnormal appearances could be seen in the films of the skull. While the child was in hospital, for four weeks the temperature had been of the continuous remittent type. Dr. Grieve added that, after the birth of the child, it had been discovered that the mother had "open" tuberculosis. She had been treated by compression of the lung, and had promptly ceased to feed the baby at the breast. The baby had been seriously infected, however, and though there was presumably a neurological basis for the transient hemiparesis, invasion of the blood stream had taken place. Dr. Grieve felt justified in regarding the prognosis as not absolutely hopeless. He had come across a number of cases in which patients with chronic miliary tuberculosis had recovered, perhaps only to succumb to some other tuberculous lesion later. He had to place that patient in the "subacute" group, however, at the time of the meeting, and the cerebral lesion made the outlook extremely grave.

Dr. Southby said that the case demonstrated again the oft-repeated story of the risk of allowing a baby to remain in contact with a tuberculous mother; even a few days could suffice for much damage to be done. He was in agreement with Dr. Grieve that the prognosis was not altogether hopeless. He recalled a similar case a few years earlier, in which Dr. Reginald Webster had recovered the specific organisms from the gastric contents of a young child with radiographic evidence of miliary tuberculosis; that child had weathered an attack of measles and an abscess of the maxillary region, but had died about two years afterwards. Dr. Southby asked whether an examination of the gastric contents for tubercle bacilli had been made in the present case.

DR. H. L. STOKES said that intracranial tuberculomata were not uncommon in England and Scotland, but were seldom if ever encountered locally. He asked Dr. Webster whether he had come across any examples in the pathological department of the hospital.

DR. REGINALD WEBSTER said that he could confirm Dr. Stokes's observation, and thought that the prevalence of bovine tuberculosis in such places as Glasgow and its relative rarity locally might account for the facts. He had never seen a brain focus large enough to be dignified by the term "tuberculoma"; he had, however, found little caseous foci, the rupture of one of which would be sufficient to cause tuberculous meningitis.

Dr. Grieve, in conclusion, said that the child's gastric contents had not been investigated, but he would arrange with Dr. Webster to make the examination at an early date.

Abdominal Type of Hodgkin's Disease.

Dr. Grieve also showed a child, aged six years, who had been subjected to operation for suspected appendicitis, but the appendix was not inflamed; there were numerous adhesions and bunches of cherry-shaped glands in the mesentery. It was known that about six months earlier a gland had been enlarged in the right groin and that the child had complained of pain in the left iliac region and also around the umbilicus, and that tenderness had been present below the ribs on the right side. The patient was moderately anæmic, but the differential leucocyte count gave normal results. The Mantoux and Widal tests gave negative results, and the appearances in X-ray films of the chest were well within the limits of normality. The temperature chart showed periodical "steeple" rises rather than "plateau" rises, and the range of temperature had been between 97° and 105° F. The gland removed from the right groin at the operation had been investigated pathologically, and from microscopic sections the typical features of Hodgkin's disease could be demonstrated. Since the child's admission to hospital on September 26, 1942, the spleen had become palpable. Dr. Grieve thought that the members of the society would like to see the child, hear the history and express opinions about treatment and prognosis.

Dr. Southby thanked Dr. Grieve for bringing the matter to notice. He said he was aware of the value of deep X-ray therapy in Hodgkin's disease of the cervical region, but he asked for Dr. Grieve's opinion of the prospects of obtaining benefit by that means in the abdominal form of the disease.

DR. H. BOYD GRAHAM said that he had been sufficiently impressed with the results of periodical courses of deep X-ray therapy in various cases of Hodgkin's disease to be confident that it would help in the present instance. The child's body was small, and satisfactory penetration should be possible. The disease was not yet widespread; but without deep X-ray therapy the patient would not have more than two years to live. He could recall several cases in which children were still living ten years or more after deep X-ray therapy had been initiated; but it was usually considered advisable to be thorough and to repeat courses of treatment annually for several years. Dr. Southby's remarks about the efficacy of deep X-ray therapy in the cervical type of the disease had prompted Dr. Graham to refer to the classical case of an earlier patient; Dr. Douglas Stephens had performed a surgical dissection of the glands of the neck for Hodgkin's disease believed to be limited to those glands, the biopsy specimen had been kept at the hospital, and some ten years later the patient had been traced and found to be a sturdy, healthy young adult. At that time the specimen had been reexamined and further sections had been made, with confirmation of the original diagnosis. Such an experience justified the advocacy of surgical treatment at an early stage when the disease was circumscribed and accessible.

Dr. Grieve, in reply, said that the patient would have deep X-ray therapy, and that he could produce numbers of patients who had survived for years because of that form of treatment; the abdominal region was not, however, a favourable site for it.

Suprarenal Neuroblastoma with Mikulicz's Syndrome.

DR. H. J. SINN discussed the case of a female child, aged three years and six months. Death had robbed him of the opportunity to present the girl herself, but he hoped, with the aid of a narration of the history, and with the presentation of photographs of the child and of the radiological features and autopsy specimens, to give the members of the society some idea of her condition preceding death. The child was the first daughter of healthy parents, the second child having attained the age of ten months without mishap. Her first acquaintance with the hospital had begun eighteen months earlier, when she was admitted suffering from bronchopneumonia and empyema. In spite of the subsequent development of bronchopleural fistula, and with the help of several blood transfusions, she survived. She next came under observation about two months prior to the meeting. Her parents were concerned with the development of bruising of the right eyelids, a condition that made its appearance without trauma, and which persisted with little change for a period of one month. During the ten days preceding this interview, the child had suffered from three attacks of headache, abdominal pain and vomiting lasting for about twelve hours. The parents' concern was heightened by the fact that during the last day they noticed bruising of the left eyelids and a developing bilateral squint.

On examination at the time, the child was very refractory, her behaviour being quite a contrast to her usual contented demeanour. Her head was abnormally large, with frontal prominence and localized bony swelling in the interparietal area, and prominence of the skull over the ears. The bridge of the nose was flattened. Ecchymoses were present in both eyelids, more pronounced on the right. The liver was enlarged.

A provisional diagnosis of suprarenal neuroblastoma with secondary skull metastases was made, and the child was admitted to hospital for further investigation. X-ray examination of the skull failed to substantiate the clinical impression of secondary metastases in the skull. Chloroma was thought of as a possible diagnosis; but examination of the blood disclosed no evidence of leuchæmia. No pathological change was detected in the urine, the cerebro-spinal fluid or the *fundi oculorum*. The Wassermann test produced no reaction. Examination of a smear taken from the bone marrow revealed a notable absence of cells of the granular series, with a relative increase of immature cells of the lymphatic series. This finding was taken as consistent with lymphatic leuchæmia. The diagnosis of chloroma was

enhanced by the increasing pallor of the child, the subsequent enlargement of the spleen as well as the liver, and the increase in size of the lachrymal glands and parotid and submaxillary salivary glands on both sides (Mikulicz's syndrome). At this stage it was thought that she would be the subject of provocative discussion at the next monthly meeting of the society, but this presentation was circumvented by her death.

Dr. Sinn went on to say that he had performed the autopsy. A localized, regular, rounded hæmorrhagic tumour stretched to its very limit the right suprarenal capsule. This tumour had indented the upper pole of the right kidney, causing that organ to rotate on its longitudinal axis from left to right, so that the renal pelvis faced outwards. A large number of secondary metastases were present in the bony skull, causing excrescences outwards and internally. Both orbits contained hæmorrhagic tumours. The liver was riddled with secondary growths. Two were also present in the eighth rib on the right side. The specimens had been temporarily mounted by Dr. Webster for the benefit of the members. Dr. Sinn showed in X-ray films evidence of secondary tumour formation in the skull and long bones. He also showed photographs of a number of suprarenal neuroblastomata culled from the Great Ormond Street Hospital collection.

Correspondence.

RESTRICTIONS ON THE SALE OF PATENT MEDICINES.

SIR: It is very surprising that more interest has not been aroused amongst members of the profession by the action of the Federal Government in removing restrictions on "patent medicines". The following appeared in 1914 in the Report from the Select Committee on Patent Medicines: "For all practical purposes British law is powerless to prevent any person from procuring any drug, or making any mixture, whether potent or without any therapeutical activity whatever (as long as it does not contain any scheduled poison), advertising it in any decent terms as a cure for any disease or ailment, recommending it by bogus testimonials and the invented opinions and facsimile signatures of fictitious physicians, and selling it under any name he chooses, on the payment of a small stamp duty, for any price he can persuade a credulous public to pay."

The intervening years have done little to improve this appalling state of affairs. Legislative reform is long overdue and it is obviously the duty of a government to protect the public from such exploitation. The public is incredibly gullible in matters relating to medicine, as doctors well know, and it is a sad commentary on political expediency that a government should have been forced to repeal its previous enactment.

The volume of the trade in patent medicines is enormous, and it is a fact that in 1935 the sale of patent medicines in Great Britain was two to three times as great as the cost of drugs prescribed by doctors under national health insurance.

I should like to place in the hands of every citizen a copy of the monograph "Patent Medicines" by the late Professor A. J. Clark, of Edinburgh University, and published by the proprietors of *Fact*, Limited, of London, in 1938. It is indeed a damning indictment of the patent medicine racket.

Yours, etc.,

H. PATTERSON.

57, East Street,
Ipswich,
Queensland.
April 24, 1943.

A CASE OF CAVERNOUS SINUS THROMBOSIS WITH RECOVERY.

SIR: I have read with interest Dr. Doyle's report of a case of recovery following cavernous sinus thrombosis. He states that literature does not record a report of a recovery of this condition, prior to sulphanilamide therapy. The case here described did not receive any sulphanilamide.

Some seven years ago I operated on a young man at Molong Hospital for what I thought to be an orbital cellulitis following an infected frontal sinus and ethmoids, but what turned out to be a commencing cavernous sinus thrombosis. The right eye was very swollen, the lids could only be opened with great difficulty, the conjunctiva was chemotic and the eyeball fixed. There was also congestion of his optic disks. The swelling was extending to the other eye. His temperature was 104°, and he was almost comatose. I did an external frontal sinus operation, using the classical incision which severs the facial vein. The frontal sinus was healthy. I also opened the right antrum and this also was healthy. At the end of the operation, I discovered what I should have at the commencement, and that was a large boil discharging in the inside of the right nares. He made an uninterrupted recovery.

From my experience with this case, I think that in the event of an impending cavernous sinus thrombosis, the classical circular frontal sinus incision should be done, the facial vein ligated and the wound left open. This in addition to the sulphanilamide therapy. The recovery was due to the large incision that was made, which cut off the source of infection by way of the facial vein and lymphatics.

Sulphanilamide therapy has been so dramatic that we are apt often to use it to excess, and I am sure in my own mind that there are many cases of mastoids that are only retarded and not cured. They simmer for months and sometimes go on to intercranial complications.

Yours, etc.,

R. E. BUCKINGHAM.

60, Anson Street,
Orange,
New South Wales.
April 30, 1943.

A METHOD OF GIVING "PENTOTHAL SODIUM" INJECTIONS.

SIR: Many anæsthetists will no doubt, like myself, have found themselves in trouble at one time or another while changing or refilling syringes in giving "Pentothal Sodium" injections.

The commonest troubles are either blood clot forming in the needle, or the constant dripping of blood when the syringe is detached.

I found that by applying the principles of a spinal injection, that is, using an obturator in the needle, these difficulties were overcome.

Unfortunately the Ungar needle made for blood transfusions and ideal for "Pentothal Sodium" injections is, I understand, unprocurable at the present time.

This fact need not deter the anæsthetist, as spinal needles with obturator can be cut down to the length required.

The needle can be inserted into the vein detached from the syringe with the obturator in place and the injection given without draining blood into the syringe.

Yours, etc.,

CHRIS. DAVIDSON.

Ashbury,
New South Wales,
April 29, 1943.

MEDICAL PLANNING: ERRATUM.

SIR: I have to apologize for an error whereby a few words omitted by me left rather a meaningless sentence (THE MEDICAL JOURNAL OF AUSTRALIA, May 8, page 431). Referring to an inclusive flat rate (of scheme of Dr. Davis, of Tamworth), it was intended to say that this would prevent men from taking on cases for financial gain only.

Yours, etc.,

C. C. MCKELLAR.

143, Macquarie Street,
Sydney,
May 10, 1943.

Obituary.

FRANK WISEMAN DOAK.

WE regret to announce the death of Dr. Frank Wiseman Doak, which occurred on April 27, 1943, at Mosman, New South Wales.

WILLIAM EDWARD BRUNSKILL.

We regret to announce the death of Dr. William Edward Brunskill, which occurred on May 1, 1943, at Melbourne, Victoria.

Naval, Military and Air Force.

CASUALTIES.

According to the casualty list received on April 29, 1943, Captain J. S. S. Winter, A.A.M.C., Toorak, who was previously reported missing, is now reported to be missing, believed prisoner of war.

According to the casualty list received on May 4, 1943, Captain A. E. H. Salter, A.A.M.C., Bathurst, is reported to have died of illness.

According to the casualty list received on May 10, 1943, Captain J. A. F. Flashman, A.A.M.C., Potts Point, who was previously reported missing, is now reported to have been killed in action.

Corrigendum.

In an article by Dr. Isadore Brodsky on congenital abnormalities, teratology and embryology, published in the issue of May 8, 1943, Figure VIII appears on page 418. Sections 1, 2 and 4 of this figure were included in error. Apologies are due to Dr. Brodsky for this mistake.

Nominations and Elections.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Knight, John Edwin, M.B., B.S., 1943 (Univ. Sydney), 173, Elizabeth Street, Ashfield.

Brown, Merna Marie, B.A., M.B., B.S., 1942 (Univ. Sydney), 9, Lennox Street, Bellevue Hill.

Webb, Pauline Hopwood, M.B., B.S., 1942 (Univ. Sydney), Sydney Hospital, Macquarie Street, Sydney.

Rutledge, Norman Heaydon, M.B., B.S., 1943 (Univ. Sydney), 48, Penshurst Street, Willoughby.

Thomas, Alfred Charles Garven, M.B., B.S., 1943 (Univ. Sydney), 71, Woniora Road, Hurstville.

Medical Appointments.

Dr. Lorna Margaret Archibald, in pursuance of the provisions of *The Public Service Acts*, 1922-1924, and *The Health Acts*, 1937-1941, of Queensland, has been appointed Junior Medical Officer in the Department of Health and Home Affairs, Brisbane, Queensland.

Books Received.

"Renal Lithiasis", by Charles C. Higgins, M.D.; First Edition; 1943. Springfield: Charles C. Thomas; London: Baillière, Tindall and Cox. 7¼" × 5¼", pp. 153, with 18 illustrations. Price: $3.00, post paid.

"The 1942 Year Book of General Therapeutics", edited by Oscar W. Bethea, Ph.M., M.D., F.A.C.P.; 1942. Chicago: The Year Book Publishers, Incorporated. 7¼" × 5", pp. 512, with illustrations. Price: $3.00, post paid.

"The Essentials of Materia Medica, Pharmacology and Therapeutics", by R. H. Micks, M.D., F.R.C.P.I.; Third Edition; 1943. London: J. and A. Churchill, Limited. 8¼" × 5¼", pp. 436. Price: 16s.

"The Principles and Practice of War Surgery, with Special Reference to the Biological Method of Treatment of Wounds and Fractures", by J. Trueta, M.D.; 1943. London: Hamish Hamilton Medical Books in conjunction with William Heinemann Medical Books, Limited. 9¼" × 6¼", pp. 407, with 136 illustrations. Price: 42s. net.

Diary for the Month.

MAY 18.—New South Wales Branch, B.M.A.: Ethics Committee.
MAY 19.—Western Australian Branch, B.M.A.: Branch.
MAY 20.—New South Wales Branch, B.M.A.: Clinical Meeting.
MAY 25.—New South Wales Branch, B.M.A.: Medical Politics Committee.
MAY 26.—Victorian Branch, B.M.A.: Council.
MAY 27.—New South Wales Branch, B.M.A.: Branch.
MAY 27.—South Australian Branch, B.M.A.: Branch.
MAY 28.—Queensland Branch, B.M.A.: Council.
JUNE 1.—New South Wales Branch, B.M.A.: Organization and Science Committee.
JUNE 2.—Victorian Branch, B.M.A.: Branch.
JUNE 2.—Western Australian Branch, B.M.A.: Council.
JUNE 3.—New South Wales Branch, B.M.A.: Special Groups Committee.
JUNE 3.—South Australian Branch, B.M.A.: Council.
JUNE 4.—Queensland Branch, B.M.A.: Branch (Joseph Bancroft Memorial Lecture).
JUNE 8.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JUNE 8.—Tasmanian Branch, B.M.A.: Branch.
JUNE 11.—Queensland Branch, B.M.A.: Council.
JUNE 15.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 16.—Western Australian Branch, B.M.A.: Branch.
JUNE 17.—New South Wales Branch, B.M.A.: Clinical Meeting.
JUNE 22.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

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